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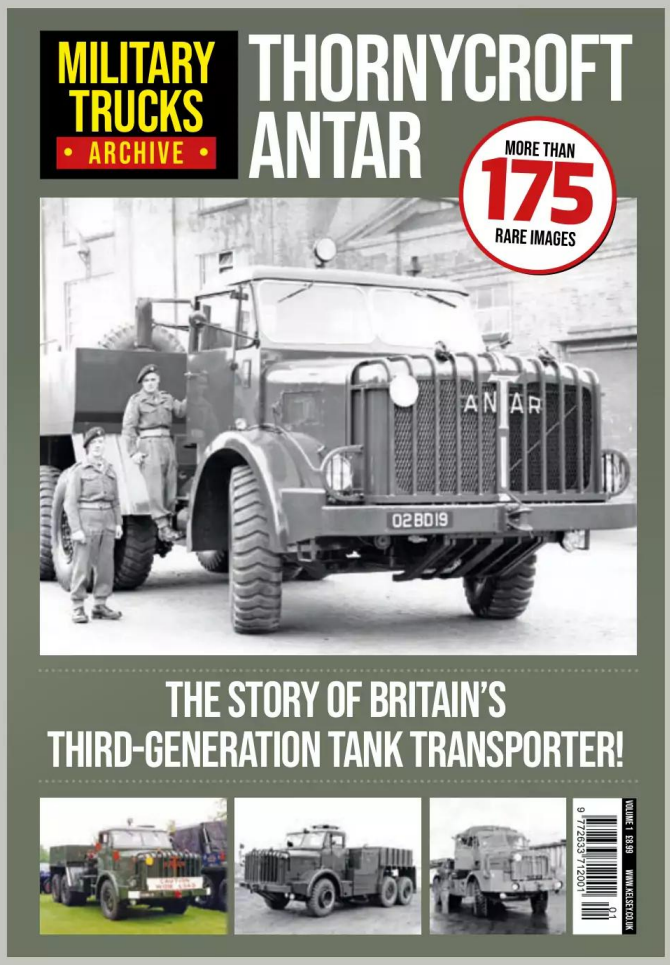

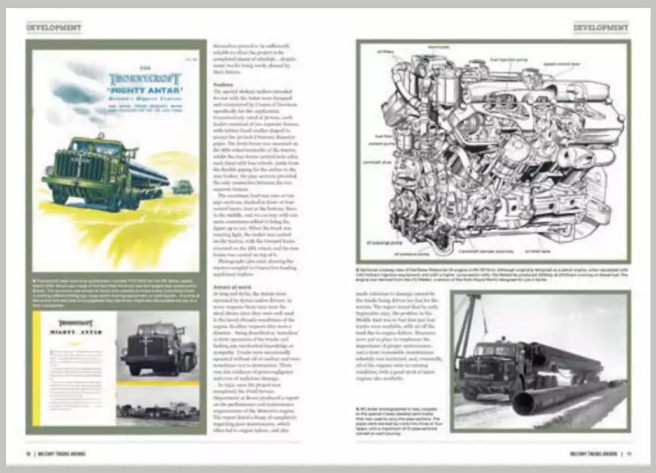

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CONTENTS

SCAMMELL PIONEER

4 INTRODUCTION
The Scammell Pioneer... Britain's first off-road heavy tractor!

7 EARLY DAYS
The origins of the Pioneer

23 THE PIONEER ENLISTS
20-ton and 30-ton tank transporters

41 DIESEL POWER AND WALKING BEAMS
The Pioneer described

55 THROUGH MUD AND SAND
From France to North Africa and Normandy... the Pioneer in service

69 THE 'OTHER' PIONEERS
Artillery tractors and recovery vehicles

75 ALL THE FUN OF THE FAIR!
Fairgrounds, road surfacing and oversized loads

87 A NEW LEASE OF LIFE
The Pioneer in preservation

98 THE FINAL WORD
Scammell at war... a moment for reflection

● The looming, friendly presence of the iconic Pioneer... captured at Scammell's Watford works. The two-tone camouflage, and the fact that the name 'Scammell' is cast into the radiator header, tells us that this is an early production vehicle, probably photographed in 1940.

Compiled and written by Pat Ware with source material from the Warehouse Archive, with special thanks to Phil Moth.

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INTRODUCTION

The Scammell Pioneer... Britain's first off-road heavy tractor!

Just as there are motorcars that have acquired iconic status – for example, the BMC Mini, the Morris Minor, Citroën 2cv, the E Type Jaguar, and the VW Beetle – so too there is a handful of trucks that exert the same emotional pull... albeit for different reasons. One such is Scammell's legendary Pioneer. Slow and cumbersome even for its time, the Pioneer was archaic, lacking front-wheel brakes and creature comforts, and with a cab that was open to the elements... but, my goodness, it was a handsome truck, with an appetite for hard work.

The Pioneer was first trialled for the tank-transporter role in 1932, and the type was introduced into military service as an artillery tractor in 1935. By 1937, the Pioneer was being produced in three variants – artillery tractor, recovery vehicle and tank transporter – all of them were powered by the low-revving, ultra-reliable Gardner diesel engine, and all of them employed Scammell's unique walking-beam rear end and pivoting front axle. More than 3500 were ultimately constructed between 1935 and 1945, but scarcely 600 of them were intended for use as tank transporters.

Despite an early upgrade from 20 to 30 tons, which just about prevented the Pioneer from being obsolete before it was introduced, it was unable to keep up with the ever-increasing weight of the tanks of the period. And, with a top speed of just 15mph (38km/h), even downhill, it was overshadowed by the

● With the pivoted front axle at full deflection, and the front wheels apparently clawing for purchase in mid-air, an early Pioneer shows just what it was made of... all of this without front wheel drive, remember!

● Rated at 18 tons, and supplied in 1932, the prototype Pioneer tank transporter featured a low-loading trailer of riveted construction, with a removable bogie. It was intended to carry the Vickers medium tank, which had a fighting weight of around 13.5 tons. A handful of these, by then obsolete, tanks fought in the Western Desert.

● Early-production 30-ton Pioneer with the original steeply-angled trailer deck. The position of the deck over the fifth wheel created an unacceptable loaded height when carrying the M3 medium tank – the General Lee or the General Grant.

far more capable Diamond T Model 980/981 which had started to come into service in 1942... and, to add insult to injury, Scammell's Watford factory was not even able to keep up with the demand for manufacturing the vehicle.

Nevertheless, the last contract for Pioneer tank transporters was not issued until 1944 and the tractor gave valiant service in France and North Africa... with a handful falling into German hands following the British Expeditionary Force's evacuation from Dunkirk.

The artillery tractor and the recovery vehicle both enjoyed significant post-war military careers, the recovery vehicle actually remaining in service into the 'eighties, but unfortunately, the tank transporter – or 'retriever' as it might well have been described – was the least successful of the three. The majority had been disposed of in the immediate post-war years. In the early 'fifties, the Pioneer had a brief flirtation with concrete blocks in an attempt to turn obsolete tank transporters into useful ballast tractors that could be used for towing engineers' plant trailers. It is hard to know whether this was a successful move or not, but the appearance of the Scammell Constructor in 1954 brought the experiment to an end.

When the military had no further use for these old warriors, they were offered up for auction. Then, as now, heavy tractors were an expensive commodity, and surplus Pioneer tank transporters were snapped up by fairground proprietors, road-makers, and heavy

● Late-model 30-ton Pioneer with the modified trailer deck that has been dropped down on either side of the swan neck. The load is a Cruiser Mk II tank. Note the dazzle-pattern camouflage applied to the tractor, typical of vehicles in the North African theatre, and consisting of a base colour of light-stone, over which are applied 'shadows' of dark grey and blue.

● Sand-painted 30-ton Pioneer and redesigned semi-trailer in the Western Desert, loaded with the US M3 medium tank. The M3 was the first US tank to be constructed in quantity, and, although far from ideal, started to appear in 1942, forming the mainstay of the fighting forces in the Middle East.

● (Right) 30-ton Pioneer of the New Zealand Army photographed in Italy, following the Allied invasion in 1943. The load is an M4 Sherman, which was close to the upper weight limit for the Pioneer.

haulage operators. In fact, for anyone who had an oversized or difficult load to move, the demobbed Pioneer was a popular – and reliable – choice. Some were fitted with elaborate bodywork by their new owners, perhaps in an attempt at hiding their origins and their age... but, that plodding Scammell reliability was always present.

Eventually, time took its toll and the Pioneers began to disappear, even from civilian use... but, before long, there came a new breed of owner. Military-vehicle enthusiasts began to seek out Pioneers, rescuing them from scrapyards and from the winter storage sites of amusement operators. Sadly, Pioneer tank transporters did not survive in large numbers, and there are even fewer examples of the original semi-trailers. But, fortunately, although they may have survived only in small numbers, most of the remaining vehicles have been restored, or are being restored, to their former glory.

'Sic transit gloria Pioneer!'

Pat Ware
Series editor

● Photographed outside the 'erecting shop' at Watford, this 30-ton Pioneer is finished in dark green matt paint with faint 'Mickey Mouse ears' shadows applied to break up the shape. The canvas radiator blind is a nice touch and note the tiny size of the single headlamp.

● Completed chassis (actually, of a breakdown-recovery vehicle) with the engine in place ready for the body to be fitted. The combination of the low-revving Gardner 6LW engine combined with the Pioneer's front and rear suspension and drive-line arrangement, gave the truck a reputation for being hard to defeat.

ABOUT THE AUTHOR

Pat Ware has been a professional writer for more than 50 years. He is the author of more than 60 vehicle-related titles, and has specialised in military-vehicle subjects since 1995. His expertise is recognised worldwide, and his books have been translated into a half-dozen languages.

In 2001, he was the founding editor of the UK's leading military-vehicle magazine, 'Classic Military Vehicle', and he continues to contribute to respected military-vehicle journals in the USA and France. In 2015 he contributed to a 10-part TV show, 'War on Wheels', for China Central Television.

His eclectic interests have also led to the publication of titles on subjects as diverse as the Cold War, commercial haulage and iconic tractors.

EARLY DAYS

The origins of the Pioneer

It is common enough for the title of a business to include reference to the founder's son – for example, D Napier & Son – and, occasionally, even to a daughter. What is far less common is to refer to other relatives... as in the case of G Scammell & Nephew, where the 'G' stood for 'George'... and the nephew was Alfred Thomas Scammell, the son of George's brother who joined George in the late 1860s.

The company was originally established as George Scammell in Fashion Street, Bethnal Green in 1837, initially producing small two-wheeled handcarts. By 1851 the business employed ten men and, as well as handcarts, was producing horse-drawn vehicles. In 1873, the company name was changed to G Scammell & Nephew in recognition of Alfred entering the business. George died in 1874 but the business continued to grow, and, by 1881, the payroll included 70 names. In 1910, Alfred was joined by his son – Alfred George Scammell – as managing director, and, by the time the Great War broke out in 1914, Scammell had become a leading agent for Foden steam wagons, as well as selling Commer trucks.

In 1919, Scammell launched Britain's first articulated vehicle... although both Thornycroft and AEC had already toyed with the principle, in 1898 and 1918, neither had pursued it. Following the pattern established by the American Knox Motors Company, with its Model 35 which incorporated the Martin Rocking Fifth Wheel, 'the Scammell six-wheeled tractor-lorry' consisted of a four-wheeled, petrol-engined tractor – described by Scammell as a 'motive unit' – that was coupled to a two-wheeled semi-trailer, or 'carrier', via a permanent, sprung fifth wheel. The maximum trailer load was seven tons, with the whole outfit rated at 12 tons, leading to Scammell's claim that the truck offered '7 1/2-tons capacity at 3 ton cost and speed'.

Within two years, the company had moved to Tolpits Lane, Watford, establishing a new factory for the production of trucks, and Scammell Lorries Limited was established as a separate company in 1922 with capital of £250,000. As well as the factory facilities at Watford, there was a drawing office at Holborn, London. By this time, the company employed 400 men and the board of directors included Lieutenant-Colonel AG Scammell as Chairman, A Howard Scammell, EW Rudd, PG Hugh, WJ Price, and RH Johnston.

Telegrams—
"Scamwheel,
Ald, London."
Scammell
Six
Wheeler
Telephone—
6770 Avenue.
WHITE'S HAULAGE Co Ltd
THERE are about one hundred Scammell Six Wheelers on the road.
Each was sold because we claimed to halve the user's costs.
None of these buyers has failed to justify our claims; none has said that we claim too much for the machine, and all are more than satisfied.
Here is a typical journey:
Load—10 tons of Cement. Journey—60 miles.
Mean Speed—12 m.p.h. Petrol—5·4 m.p.g.
There is no "snag" in figures of this sort. Our four models carry 8, 10, 12 or 15-ton loads, and each will take a trailer with an additional 5 tons.
The "Scammell" is relatively far cheaper than the next best lorry.
From Nottingham—"I myself have driven her without a mechanical hitch over all kinds of country, with an average load of 9 tons 17 cwt., and can honestly say, as yet, there is nothing to touch my machine for efficiency."
From Wolverhampton—"The Six Wheeler is giving great satisfaction, and my partner, who, up to the present, has been driving, considers it the finest vehicle on the road."
G. Scammell & Nephew, Ltd.
Watford. Spitalfields, E.I. London.

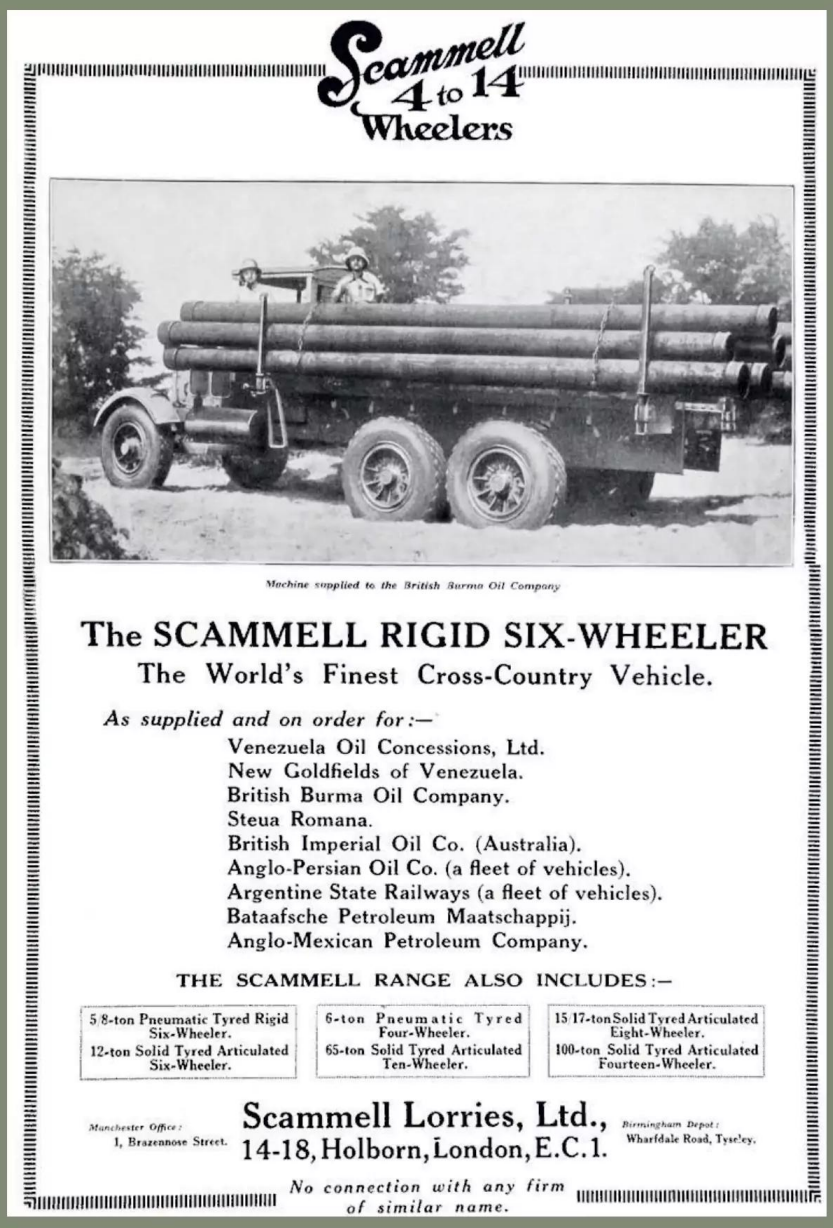
● The Scammell six-wheeled tractor-lorry consisted of a four-wheeled tractor, or 'motive unit', coupled to a two-wheeled semi-trailer, or 'carrier unit', via a sprung fifth wheel. Scammell claimed that the truck offered '7 1/2-tons capacity' at '3-ton cost and speed'; other versions were available with load ratings of 10, 12 or 15 tons. The advertisement dates from February 1922.

G Scammell & Nephew remained in business, separately, well into the post-war period, and the Fashion Street premises were only sold in 1965 when the company was taken over by York Trailers.

Scammell Lorries continued to enjoy commercial success, and the six-wheeled lorry gradually evolved, being joined by an eight-wheeler – with two axles on the trailer – rated at 12 tons. Higher-capacity drop-frame trailers were also introduced. In 1924, the frameless tanker was introduced, whereby the tank itself formed its own frame, supported by the rear wheels and the fifth wheel. This form of construction saved the better part of 15 cwt (765kg) in weight, allowing the payload to be increased by a similar amount without exceeding axle weight limits and the design was patented in 1926.

The Pioneer

In June 1927 Scammell constructed the prototype of what was to become, arguably, their most famous truck... a rigid-chassis six-wheeler that was eventually to be dubbed Pioneer. It was originally planned that there would be both 6x4 and 6x6 versions, the latter offering better traction combined with more responsive steering.



Scammell 4 to 14 Wheelers

Machine supplied to the British Burma Oil Company

The SCAMMELL RIGID SIX-WHEELER

The World's Finest Cross-Country Vehicle.

As supplied and on order for:—

Venezuela Oil Concessions, Ltd.
New Goldfields of Venezuela.
British Burma Oil Company.
Steua Romana.
British Imperial Oil Co. (Australia).
Anglo-Persian Oil Co. (a fleet of vehicles).
Argentine State Railways (a fleet of vehicles).
Bataafsche Petroleum Maatschappij.
Anglo-Mexican Petroleum Company.

THE SCAMMELL RANGE ALSO INCLUDES:—

5/8-ton Pneumatic Tyred Rigid Six-Wheeler. 12-ton Solid Tyred Articulated Six-Wheeler.	6-ton Pneumatic Tyred Four-Wheeler. 65-ton Solid Tyred Articulated Ten-Wheeler.	15/17-ton Solid Tyred Articulated Eight-Wheeler. 100-ton Solid Tyred Articulated Fourteen-Wheeler.

Manchester Office: 1, Brazennose Street.

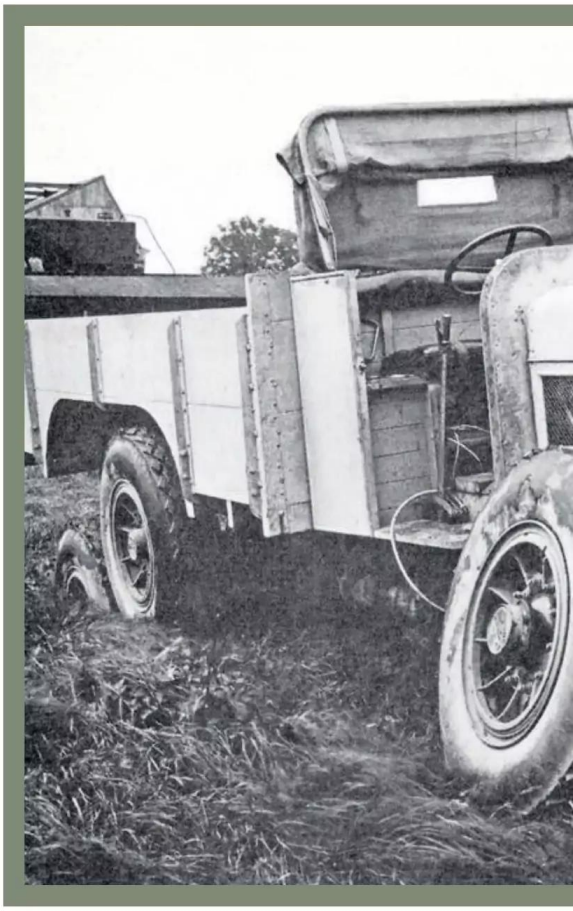
Scammell Lorries, Ltd., 14-18, Holborn, London, E.C.1.

Birmingham Depot: Wharfdale Road, Tyseley.

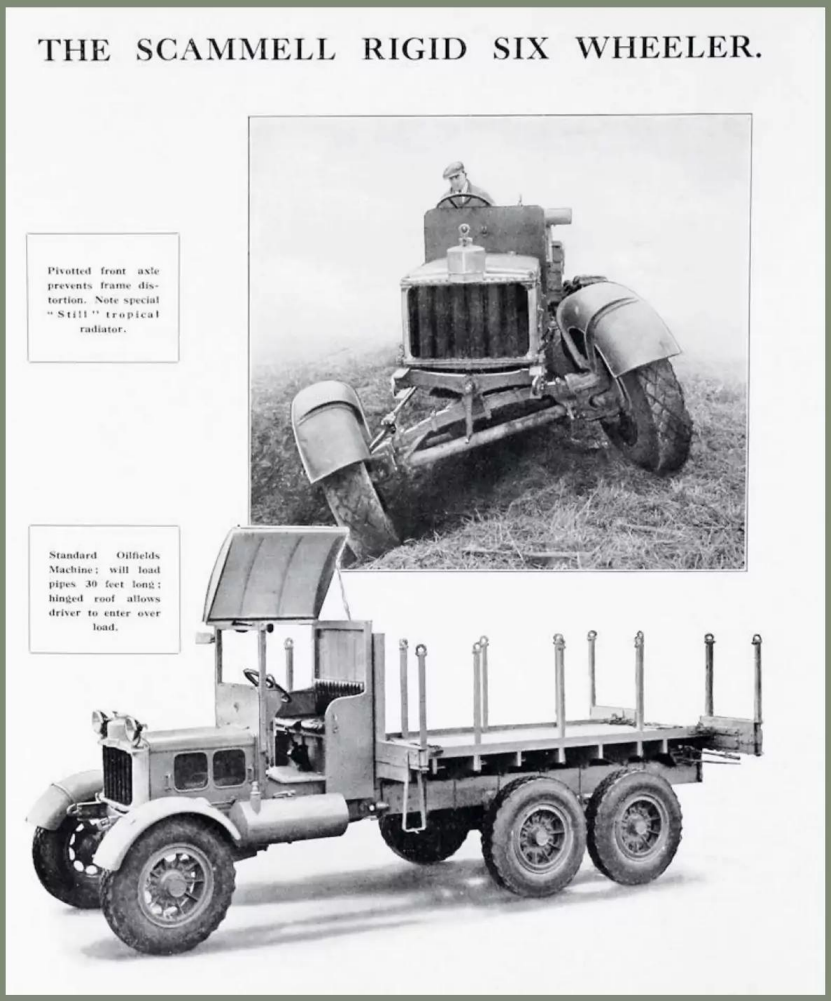
No connection with any firm of similar name.

● Trade advertisement for the Scammell rigid six-wheeler introduced in June 1927, a forerunner of the Pioneer. The advertisement, which was published in March 1930, shows a pipeline truck that was supplied to the Burma Oil Company, later to be better known as Castrol.

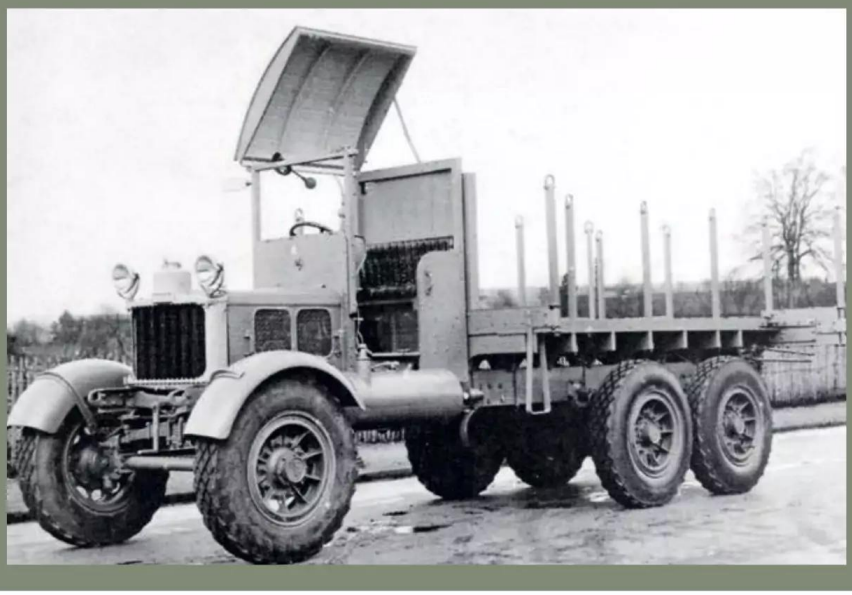
● (ABOVE) The open-cabbed tractor, or 'motive unit', component of the six-wheeled tractor-lorry was fitted with cast wheels shod with solid tyres, and featured chain drive to the rear wheels. Unlike a modern fifth wheel, the semi-trailer was bolted to the turntable. The maximum speed was limited to 12mph (20km/h) by law.



● (BELOW) Photographed in June 1927, the Pioneer prototype, although still not yet identified as such, exhibits the major features that would ultimately define the Pioneer... the walking beam gear-cases at the rear, and the pivoting front axle. The distinctive cast radiator surround has yet to appear.


THE SCAMMELL RIGID SIX WHEELER.
Pivotted front axle prevents frame distortion. Note special "Still" tropical radiator.
Standard Oilfields Machine; will load pipes 30 feet long; hinged roof allows driver to enter over load.

● The upper illustration is of a bare Pioneer chassis showing the extraordinary articulation of the front axle; note that the distinctive radiator has now been included. This is one of the trucks destined for Venezuela, and the lower illustration shows the curious hinged roof to the narrow, centrally-placed cab, designed to allow the driver access across a load of pipe sections.



● Another shot of one of the two trucks sent to Venezuela for oilfield work showing the narrow, one-man cab that allowed pipe sections to be carried on either side, thus effectively extending the load platform without extending the truck. The cast wheels were a feature of Pioneers until the mid-thirties.

Reprinted from TRANSPORT January 9, 1932.

BRITISH VEHICLES FOR GOLD PROSPECTING.

Demonstration of Scammell "Pioneer" Six-Wheelers.

SOME fifty or sixty years ago, a party of explorers who had succeeded in penetrating farther into the heart of Australia than white men had ever done before, reported the existence of gold and of fertile country in a zone hitherto regarded as utterly barren. They were, it appears, quite sure of their facts, but all efforts to exploit this attractive deposit of natural wealth were ignominiously defeated by the inability of any form of transport then available to surmount the difficulties of the route. Consequently, the venture was reluctantly abandoned, and no renewed attempt upon the treasure was made for over half a century. In April of last year, however, three white men, accompanied by a party of Australian aborigines, a string of camels, two tons of foodstuffs, ammunition, mining gear and explosives, set out in search of the gold. Many months of arduous travel elapsed before they reached their destination, the journey having been impeded by torrential rains, encounters with hostile natives, and footsore and sick camels.

Despite these hardships, the expedition was successful in discovering the auriferous belt, the potentialities of which are now being investigated by the British-Australian Gold Mining Co., Limited, whose representative is now in this country studying the problem of transport equipment for a new expedition which is to set out from Adelaide to develop the gold-bearing territory. The expedition, which, it is anticipated, will consist of some fifty explorers and a small army of Australian bushmen, will also include a number of British geologists, mineralogists, botanists and entomologists, who will travel to their destination by air. Food, fuel and other supplies will also be carried by aeroplane, whilst the main body of the party of exploration and the mining equipment will be conveyed to the scene of operations in motor vehicles. Incidentally, the articles of association of the new company stipulate that all equipment used for the expedition must be of British manufacture.

The axle articulation of the Scammell "Pioneer" rigid six-wheeler is one of its special features.

Capabilities Demonstrated.

In order to demonstrate the capabilities of the "Pioneer" rigid six-wheeler, Scammell Lorries, Limited, invited to their Watford works last week a party which included the represen-

● Reprinted from the January 1932 edition of *'Modern Transport'* magazine, the writer of this piece was deeply impressed with the performance of the truck, now finally called Pioneer, when it was put through its paces in front of an invited audience at the test track adjoining the Watford factory. Later in the day, the vehicle was joined by two more examples at the MWEE test track at Bagshot, where sand and gravel, and heavy undergrowth were easily defeated.

● 'It's enough to drive you up the wall!' In 1928, a 6x6 open-cabbed Pioneer demonstrated that it could get its front wheels seven feet (2.1m) up the wall of the Watford factory, whilst keeping all four rear wheels flat on the ground.

Early prototypes lacked the sheer presence, and for that matter, the good looks, of the classic military Pioneer that was to follow, with the radiator-mounted headlights lending something of 'Mickey Mouse' ears to the frontal aspect. Nevertheless, this was still a big truck for the period, with the front axle thrust forward of the radiator, to give a rugged, no-nonsense look. It was squarely aimed at the ever-growing oil industry, where it was expected to earn its keep hauling steel pipelines across the harsh, unforgiving terrain typical of the Middle East. Indeed, the second prototype was fitted with a curious half-width cab that allowed pipeline sections to be carried on either side.

Under the bonnet was Scammell's familiar four-cylinder 7-litre side-valve motor, with a relatively-modest power output of 85bhp (63kW) at 2000rpm. The engine, which had the cylinders cast in pairs and also had removable cylinder heads, was a long-stroke, big-bore design, that had been in production for Scammell trucks for almost five years. The cooling system consisted of a large Still tube radiator, combined with a centrifugal water pump and a thermostat; Scammell's distinctive 'coffee pot' ensured that the water level was kept above the tops of the tubes, even when the vehicle was lying at extreme angles.

The engine was coupled to the rear wheels via an internal cone clutch and four-speed gearbox, with five- or six-speed transmission also available at a later date. It was possible to specify the inclusion of a power take-off to drive a winch, pump or searchlight, and a compressor for tyre inflation, driven-off the reverse idler in the gearbox.

At the rear, was a single Kirkstall Forge overhead-worm axle, suspended on long semi-elliptical springs, with a 9in (230mm) David Brown differential. Walking beams were mounted onto the axle ends, free to pivot, or oscillate, by 12in (305mm), either up or down, on the axle ends, regardless of what its opposite number was doing on the other side of the vehicle. The final drive arrangement consisted of a spur pinion on each of the half-shafts meshed with a gear train that was completely enclosed by the walking beam. The front axle was mounted on a single, inverted, semi-elliptical spring that was

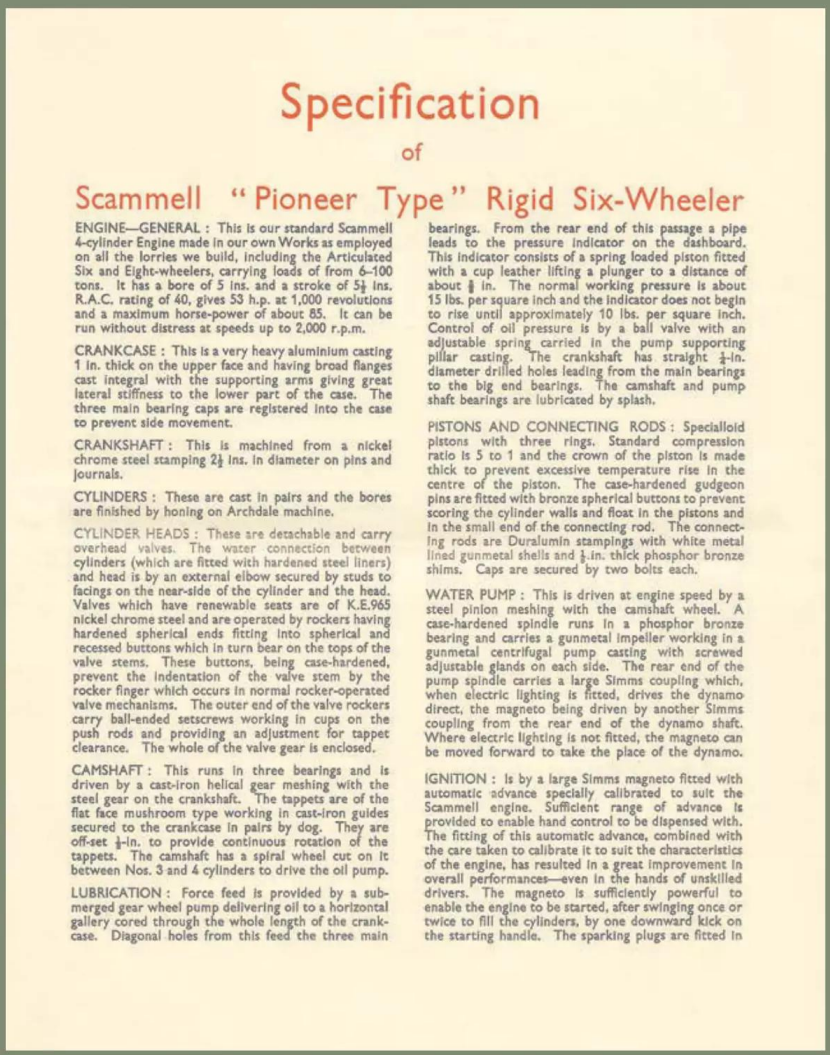
● Boasting that the Pioneer was 'British – and Best!', this brochure, dating from April 1935, extolled the virtues of the truck that could 'go where no other vehicle has been'.

● Towing a low-loader trailer, of riveted construction, on which is loaded a second trailer carrying test weights, giving a total load of 17 tons, this Pioneer demonstrates how it is able to climb a steep bank of loose gravel without difficulty.

pivoted at its centre, allowing the axle to effectively rock by 12in (305mm) around the centreline without imposing any torsional loads on the chassis. An A-frame, or perch bar, behind the axle was used to provide lateral location.

Steering gear consisted of a worm-and-sector box connected by means of a ball-jointed rod to the off-side wheel hub. There was no power assistance, of course, which, when combined with the huge Goodyear pneumatic tyres, measuring up at 44x10in, must have made slow-speed cornering extremely hard work. Kennedy & Kemp caterpillar tracks were available to enhance traction at the rear, either in very soft going, or on icy or snow-covered roads.

The chassis consisted of twin rolled-steel channels, measuring up at 3x8in (76x204mm), reduced in depth and upswept at the front to provide clearance for the considerable movement of the spring and axle. There were five cross-members, of either tubular or box-section steel, the front cross-member being used as a pivot mount for the front axle. It was an impressive piece of design, the work of Scammell's designer, Oliver Danson North (1887-1968), who had joined the company in 1922. Although eschewing the complexity of all-wheel drive – remember, this was a truck that had yet to be fitted with front-wheel brakes – North's unique suspension arrangement at the front, coupled with the innovative walking-beam gear cases at the rear,



Specification
of
Scammell "Pioneer Type" Rigid Six-Wheeler

ENGINE—GENERAL : This is our standard Scammell 4-cylinder Engine made in our own Works as employed on all the lorries we build, including the Articulated Six and Eight-wheelers, carrying loads of from 6–100 tons. It has a bore of 5 ins. and a stroke of 5½ ins. R.A.C. rating of 40, gives 53 h.p. at 1,000 revolutions and a maximum horse-power of about 85. It can be run without distress at speeds up to 2,000 r.p.m.

CRANKCASE : This is a very heavy aluminium casting 1 in. thick on the upper face and having broad flanges cast integral with the supporting arms giving great lateral stiffness to the lower part of the case. The three main bearing caps are registered into the case to prevent side movement.

CRANKSHAFT : This is machined from a nickel chrome steel stamping 2½ ins. in diameter on pins and journals.

CYLINDERS : These are cast in pairs and the bores are finished by honing on Archdale machine.

CYLINDER HEADS : These are detachable and carry overhead valves. The water connection between cylinders (which are fitted with hardened steel liners) and head is by an external elbow secured by studs to facings on the near-side of the cylinder and the head. Valves which have renewable seats are of K.E.965 nickel chrome steel and are operated by rockers having hardened spherical ends fitting into spherical and recessed buttons which in turn bear on the tops of the valve stems. These buttons, being case-hardened, prevent the indentation of the valve stem by the rocker finger which occurs in normal rocker-operated valve mechanisms. The outer end of the valve rockers carry ball-ended setscrews working in cups on the push rods and providing an adjustment for tappet clearance. The whole of the valve gear is enclosed.

CAMSHAFT : This runs in three bearings and is driven by a cast-iron helical gear meshing with the steel gear on the crankshaft. The tappets are of the flat face mushroom type working in cast-iron guides secured to the crankcase in pairs by dog. They are off-set ¼-in. to provide continuous rotation of the tappets. The camshaft has a spiral wheel cut on it between Nos. 3 and 4 cylinders to drive the oil pump.

LUBRICATION : Force feed is provided by a submerged gear wheel pump delivering oil to a horizontal gallery cored through the whole length of the crankcase. Diagonal holes from this feed the three main bearings. From the rear end of this passage a pipe leads to the pressure indicator on the dashboard. This indicator consists of a spring loaded piston fitted with a cup leather lifting a plunger to a distance of about ⅛ in. The normal working pressure is about 15 lbs. per square inch and the indicator does not begin to rise until approximately 10 lbs. per square inch. Control of oil pressure is by a ball valve with an adjustable spring carried in the pump supporting pillar casting. The crankshaft has straight ½-in. diameter drilled holes leading from the main bearings to the big end bearings. The camshaft and pump shaft bearings are lubricated by splash.

PISTONS AND CONNECTING RODS : Specialloid pistons with three rings. Standard compression ratio is 5 to 1 and the crown of the piston is made thick to prevent excessive temperature rise in the centre of the piston. The case-hardened gudgeon pins are fitted with bronze spherical buttons to prevent scoring the cylinder walls and float in the pistons and in the small end of the connecting rod. The connecting rods are Duralumin stampings with white metal lined gunmetal shells and ½ in. thick phosphor bronze shims. Caps are secured by two bolts each.

WATER PUMP : This is driven at engine speed by a steel pinion meshing with the camshaft wheel. A case-hardened spindle runs in a phosphor bronze bearing and carries a gunmetal impeller working in a gunmetal centrifugal pump casting with screwed adjustable glands on each side. The rear end of the pump spindle carries a large Simms coupling which, when electric lighting is fitted, drives the dynamo direct, the magneto being driven by another Simms coupling from the rear end of the dynamo shaft. Where electric lighting is not fitted, the magneto can be moved forward to take the place of the dynamo.

IGNITION : Is by a large Simms magneto fitted with automatic advance specially calibrated to suit the Scammell engine. Sufficient range of advance is provided to enable hand control to be dispensed with. The fitting of this automatic advance, combined with the care taken to calibrate it to suit the characteristics of the engine, has resulted in a great improvement in overall performances—even in the hands of unskilled drivers. The magneto is sufficiently powerful to enable the engine to be started, after swinging once or twice to fill the cylinders, by one downward kick on the starting handle. The sparking plugs are fitted in

● 1935 technical specification for what was described as the 'Pioneer Type Rigid Six-Wheeler'.

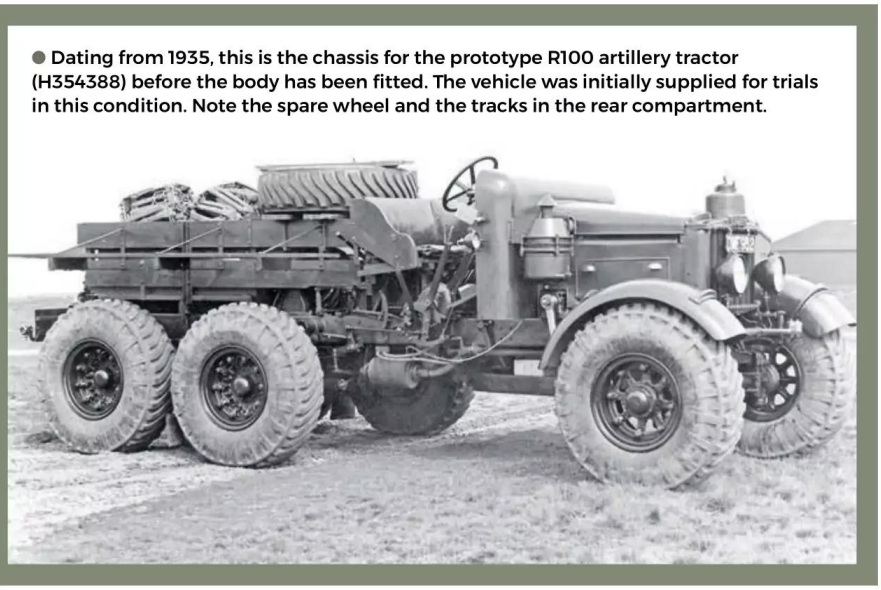
ensured that the Pioneer would not be defeated by a lack of proper roads.

On test, the Pioneer was always impressive, climbing out of holes and ditches, and scaling banks with its front wheels apparently scrabbling for traction in free air. But, its party piece was to climb the wall of the Watford factory... a 6x6 open-cabbed Pioneer, dating from 1928, could get its front wheels seven feet (2.1m) up a wall, whilst keeping the rear wheels flat on the roadway. When fitted with cross-country tyres, the Pioneer was said by the, then, Mechanical Warfare Experimental Establishment (MWEE) to exhibit 'markedly superior' performance when compared to the conventional military 6x4 truck.

The first two trucks to be constructed had been sent to Venezuela for oilfield work. At least one other went to the Indian Army, equipped with all-wheel drive and a five-speed gearbox, although it failed to blaze a trail and there were no further contracts forthcoming. In fact, it was to be a further three years before the company received further orders. In August 1929, a single Pioneer artillery tractor was supplied to the British Army and was pitted in trials against an AEC-FWD R6T, with 6x6 drive, and an eight-wheeled Guy. AEC won the trials but the Scammell, registered MG 9080, remained at Farnborough where it was used for recovery work, eventually being rebodied to resemble the standard artillery tractor.

In 1932, the Iraq Petroleum Company placed an order for 21 Pioneer tractors, complete with extensible girder semi-

● Early R100 artillery tractor chassis doing what it does best during trials at Watford. Note the tracks enclosing the rear wheels.



● Dating from 1935, this is the chassis for the prototype R100 artillery tractor (H354388) before the body has been fitted. The vehicle was initially supplied for trials in this condition. Note the spare wheel and the tracks in the rear compartment.

● This is reputed to be the chassis of the vehicle that appeared on the front cover of the 1935 sales brochure. Note the Scammell engine and the huge horizontal winch.

● The first Pioneer tank transporter was supplied in 1932. Rated at a nominal 18 tons, it consisted of a Pioneer tractor, coupled to a low-loading semi-trailer of riveted construction designed to transport the Vickers medium, or similar, tank; in this photograph the tank is a Vickers A6E1. In order to get the tank on board, it was necessary to detach the bogie wheels of the trailer.

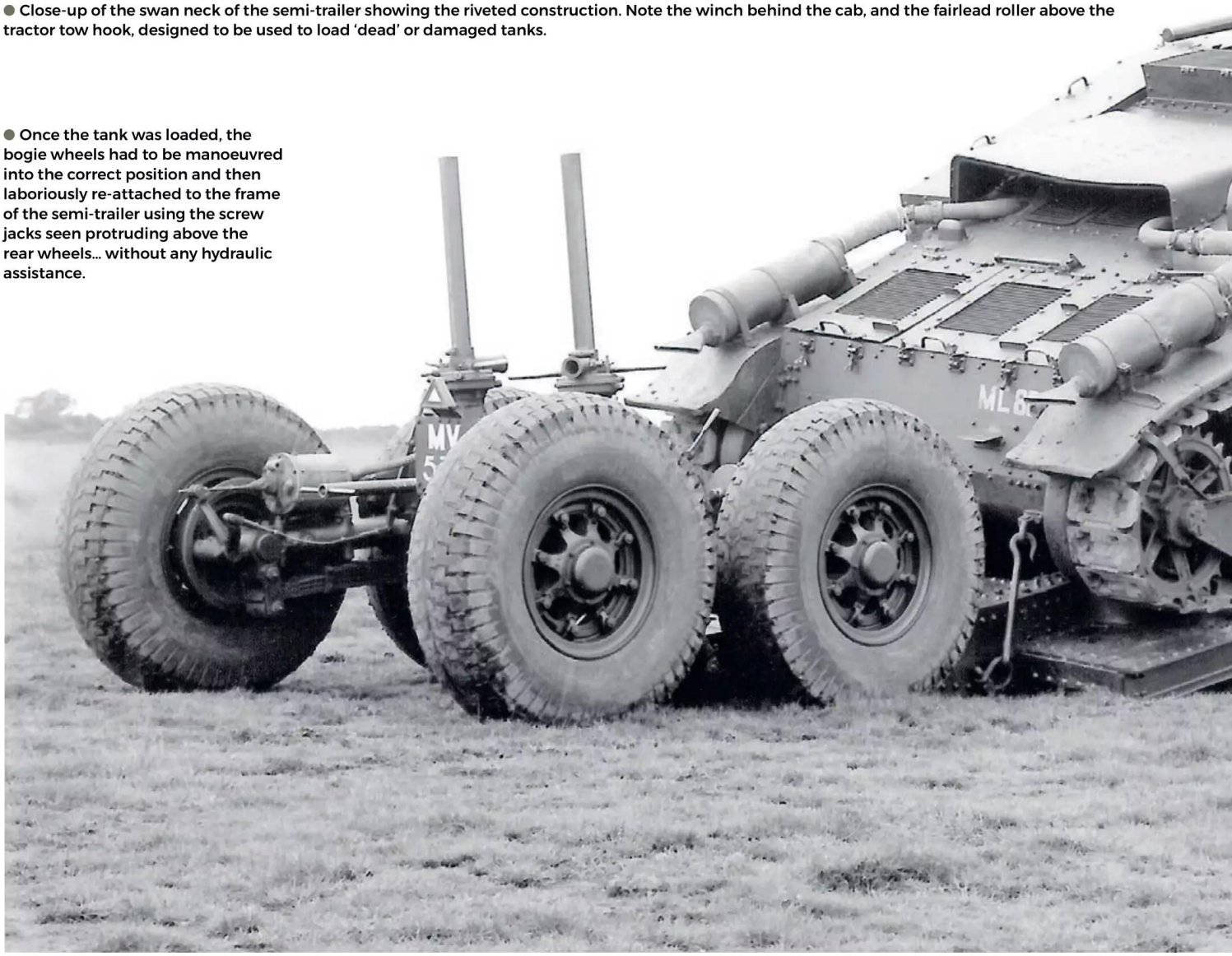
● These illustrations are taken from *'The Engineer'* magazine, January 1932. The upper photograph shows how the Pioneer dwarfs an Austin Seven motorcar, whilst the lower picture, taken at the MWEE test facility at Bagshot, shows a Pioneer carefully picking its way over rough ground, loaded with several tons of round timber masquerading as pipeline sections.

trailers. These trucks were intended for work on the development of the Mosul oilfield, carrying 40-50 foot (12.2-15.25m) pipeline sections. More contracts followed, for example from Shell, from the Anglo-Persian Oil Company, who used their Pioneers as tankers, and from South African Roadways, who used theirs as general load carriers... nearer home, the Newcastle-upon-Tyne Electric Supply Company purchased one, and Edinburgh Corporation Electricity Department had two.

The company held demonstrations for the press and representatives of the British Australian Gold Mining Company, running three rigid-chassis Pioneers at their Watford works and at a nearby gravel pit during the first week of 1932. The Pioneers made short work of even the most difficult sections of the track, ploughing through mud that was more than a foot (305mm) deep, running with the nearside wheels in shell holes, and climbing sand heaps with a gradient of 50% (1:2). Not once did the wheels spin or the vehicle fail to proceed... *'Modern Transport'* magazine was sufficiently impressed to write '... mere description is inadequate to convey a true impression of the performance of these remarkable machines'. And, Scammell themselves were hardly less effusive, writing that 'the Scammell Pioneer was driven under (these) apparently impossible conditions with a reckless abandon that was breath-taking... subsequently crossing deep, sandy ditches and surmounting

● Close-up of the swan neck of the semi-trailer showing the riveted construction. Note the winch behind the cab, and the fairlead roller above the tractor tow hook, designed to be used to load 'dead' or damaged tanks.

● Once the tank was loaded, the bogie wheels had to be manoeuvred into the correct position and then laboriously re-attached to the frame of the semi-trailer using the screw jacks seen protruding above the rear wheels... without any hydraulic assistance.



sand dunes... under whatever conditions the assembled experts indicated the test should be made, the vehicle functioned'.

The vehicle's cross-country performance was sufficiently impressive to attract potential military users, and examples were eventually sold to Japan and France, the latter subsequently to be photographed under the 'ownership' of the *Wehrmacht* loaded with a Somua 35S tank.

The first Pioneer tank transporter

During the Great War, tanks had been delivered to a rail head that was as close as possible to the front line, and were then driven under their own power to the front, with the inevitable mechanical wear and tear and the possibility of breakdown. In 1918, the British Army had unknowingly predicted the future of tank transporting when it experimented with a modified, crew-cabbed AEC solid-tyred tractor that was coupled to a 5-6 ton semi-trailer. Constructed by East London based company HC Bauly, the outfit was actually designed to carry Holt artillery tractors, but, in 1928, one of these tractors was trialled carrying a Vickers medium tank. However, the Army never purchased more than a solitary example.

The Army had also carried out trials with a second-hand Pioneer in 1927, but it was still to be a further five years before Scammell managed to persuade the War Office that it really should take a look at what the Pioneer could do. Finally, in 1932, a Pioneer tractor, and low-loading swan-neck semi-trailer, were acquired for use as a tank transporter.

Numbered T22509 – sometimes rendered as H22509 – and registered in Middlesex, as MV 5364, the vehicle was described as 'transporter, heavy, 10-wheeled', and was intended to transport the 13-ton (13.24 tonne) Vickers medium tank. The use of a 7-ton Turner winch, fitted between the tractor cab and the turntable, allowed disabled tanks to be accommodated thus making the vehicle also suitable for recovery work.

With the distinctive 'coffee pot' radiator, a narrow two-man cab, and enormous balloon tyres, it was very much like the commercial Pioneers of the period.

The semi-trailer, which was conservatively rated at 18 tons was coupled to the tractor by means of a permanent fifth wheel, and the rear bogie was designed to be removed to

● The '100-tonner' was constructed around a unique riveted box-frame design and was originally powered by a 7-litre Scammell four-cylinder engine, although this was eventually replaced by a Gardner 6LW diesel unit. This is the first of the two tractors to be constructed.

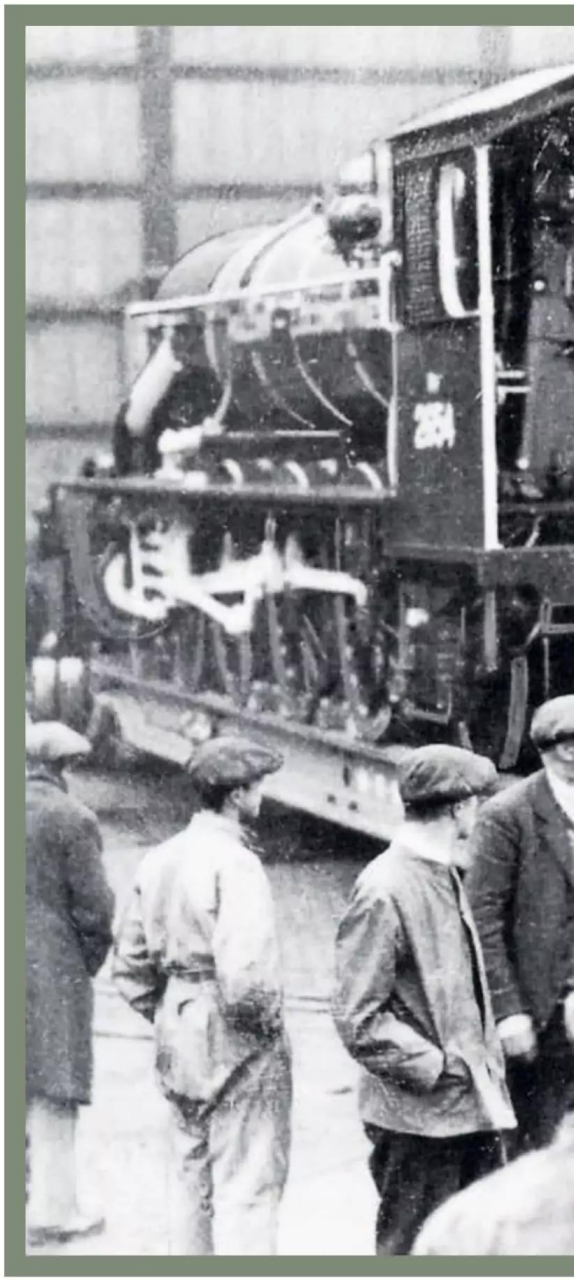
● A rudimentary cab was provided at the rear of the semi-trailer, occupied by a brake and steersman who was in contact with the front cab by means of a sound-powered telephone system.

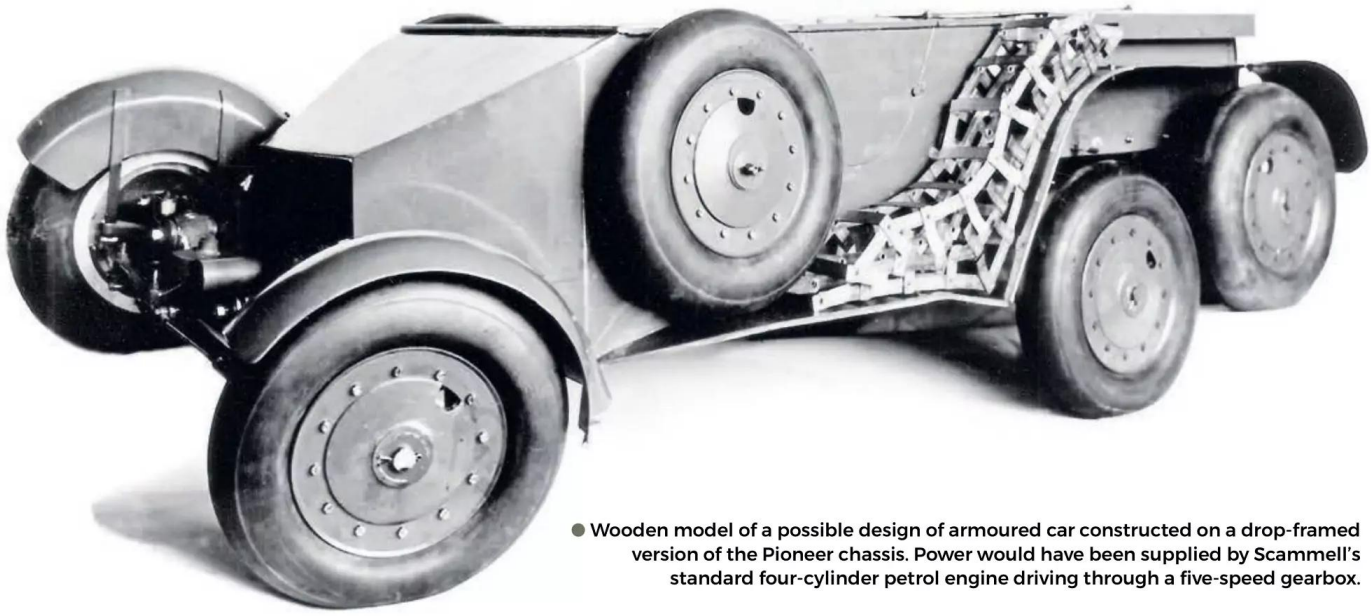
allow the tank to be loaded. Lacking the niceties of modern hydraulics, there were manually-operated ratchet screw jacks fitted to the bogie to allow it to be raised or lowered, and, once separated from the semi-trailer, the bogie had to be man-handled out of the way to allow the tank to be driven or winched on board. It was a heavy and laborious business and it would be fair to say that the vehicle was not a great success. The steering was inordinately heavy, and there were difficulties encountered with using the screw jacks. Drivers complained that the length of the vehicle – some 599in (15,214mm) – caused it to 'cut in' on turns... even the MWEE stated that 'its chief drawback, from a military aspect, is its bulk and conspicuousness'. It remained in service for some years, but it seems that it was largely considered to be a training aid for Ordnance Corps staff and its ultimate fate remains a mystery.

Scammell had to wait a further five years before the War Office started to take the business of tank transporting seriously and, by the time the authorities recognised that perhaps the tank transporter did have a useful role to play, Scammell were busy with other work and could never produce enough tank transporters to satisfy demand.

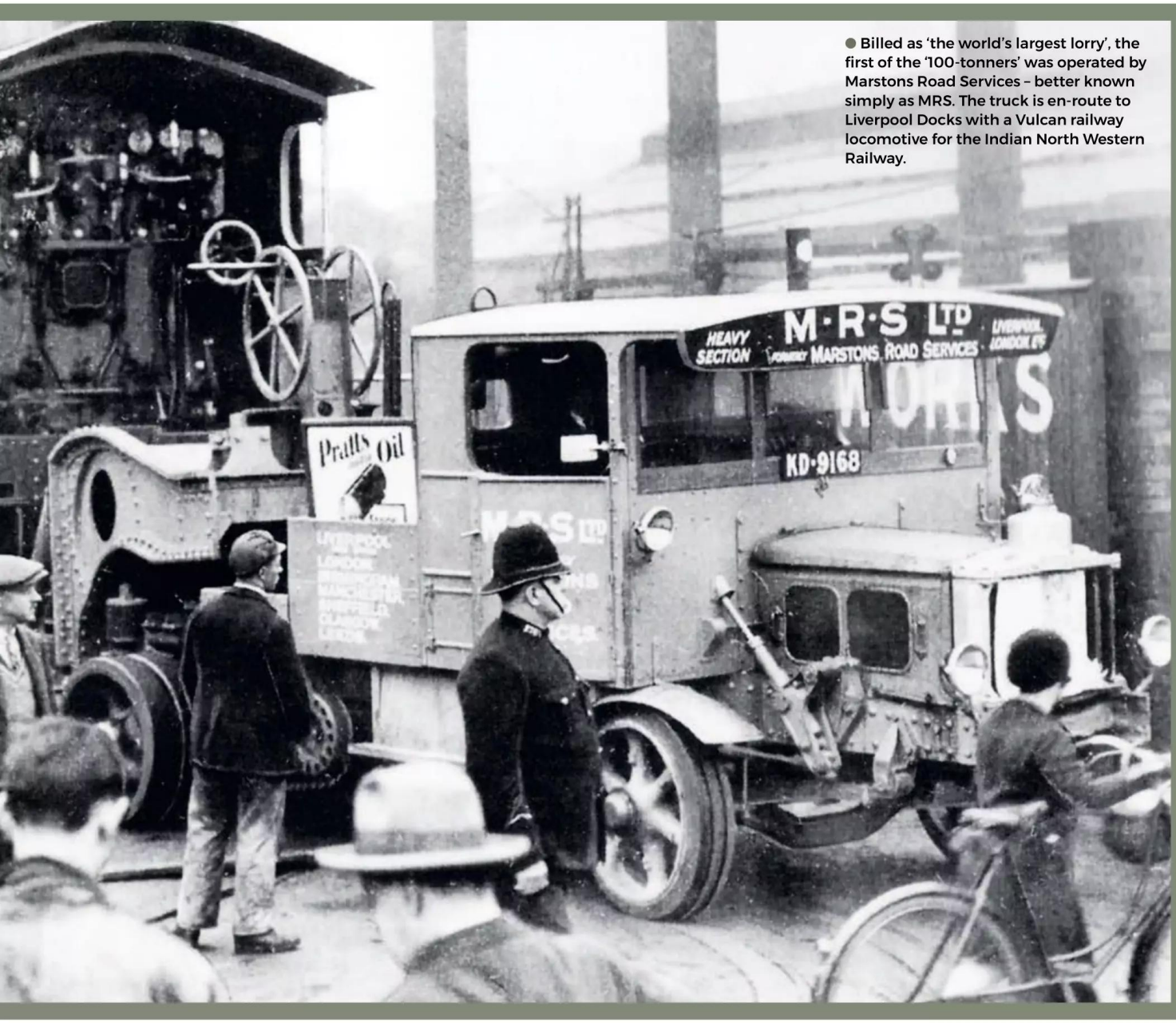
Experimental armoured car

In May 1927, Scammell approached the War Office with a specification and design for a six-wheeled armoured car based on the, then new, Pioneer chassis. The automotive details were near identical to those offered on the standard Pioneer, but the chassis was of drop-frame design, and was lowered by 8in (201mm) compared to the standard offering, and was shortened to give a wheelbase of 135in (3429mm). A special five-speed gearbox was fitted, and the radiator was 9in (230mm) lower than standard and approximately 4in (102mm) wider, and was provided with





● Wooden model of a possible design of armoured car constructed on a drop-framed version of the Pioneer chassis. Power would have been supplied by Scammell's standard four-cylinder petrol engine driving through a five-speed gearbox.



● Billed as 'the world's largest lorry', the first of the '100-tonners' was operated by Marstons Road Services – better known simply as MRS. The truck is en-route to Liverpool Docks with a Vulcan railway locomotive for the Indian North Western Railway.

● In 1928, presumably intrigued by the wooden model, MWEE purchased a suitable chassis for the armoured car and fitted it with a mock-up wooden body carrying two rotating turrets, armed with machine guns. There was no series production and eventually the wooden body was removed and the vehicle was converted to a breakdown-recovery tractor by attaching a Harvey Frost crane to the chassis. In this form it survived until 1944.

a five-bladed cooling fan.

The weight of the chassis was said to be 4.9 tons (5000kg), and Scammell were at pains to point out that the centre of gravity was approximately 40in (1030mm) in front of the centreline of the rear axle; this had been achieved, in part, by moving the front axle 13in (330mm) further forward.

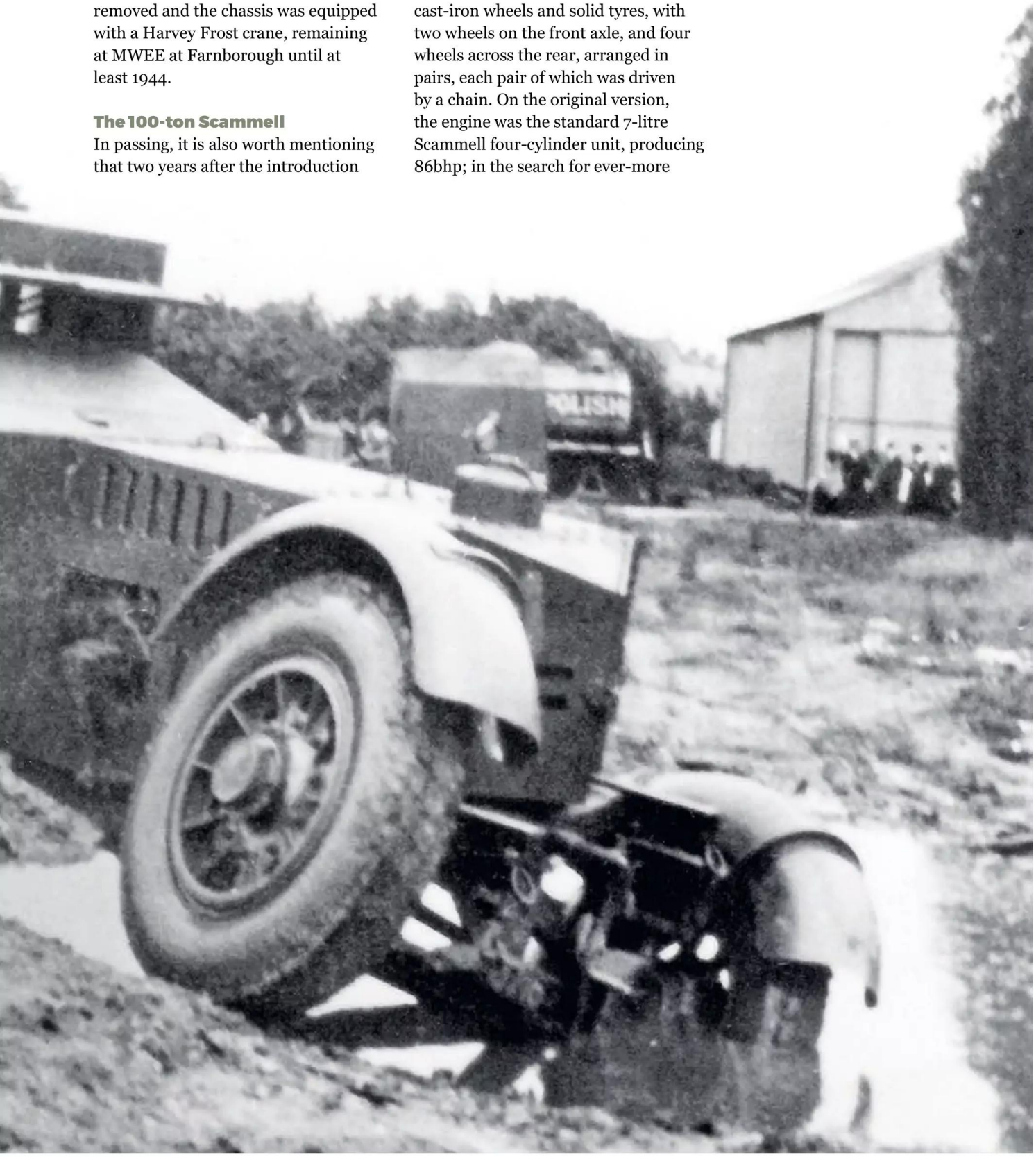
With a plywood mock-up of the turreted armoured body in place, the

vehicle was subjected to 3220 miles (5216km) of testing at MWEE during 1928/29. At the end of the trials, the chassis was said to be unsuitable for use as an armoured car, and it was briefly considered that it might be suitable for anti-aircraft defence. When this notion, too, was abandoned, the body was removed and the chassis was equipped with a Harvey Frost crane, remaining at MWEE at Farnborough until at least 1944.

The 100-ton Scammell

In passing, it is also worth mentioning that two years after the introduction of the Pioneer in 1929, Scammell launched its famed '100-tonner' giving the company valuable experience with heavy tractors.

Developed by Oliver North in conjunction with Marston Road Services, the '100-tonner' consisted of a petrol-engined tractor, running on cast-iron wheels and solid tyres, with two wheels on the front axle, and four wheels across the rear, arranged in pairs, each pair of which was driven by a chain. On the original version, the engine was the standard 7-litre Scammell four-cylinder unit, producing 86bhp; in the search for ever-more power the Scammell engine was eventually replaced by a Gardner 6LW diesel unit giving 102bhp... the very same power unit as was later to be found in the Pioneer tank transporter. The transmission consisted of the standard Scammell four-speed gearbox, with the number of ratios doubled-



up to eight by means of a two-speed primary differential. The chassis was a unique riveted box-frame design.

The swan-necked box-girder trailer was supported on the fifth wheel at the front end, and was provided with eight, steerable wheels at the rear: a 65-ton variant was also produced, using just four wheels at the rear.

In order that this mighty truck could negotiate its way through Britain's narrow streets, a large vertical steering wheel was provided at the rear, operated by a brake and steersman who was in contact with the cab by means of an Alfred Graham sound-powered telephone system.

Just two of these unique vehicles were constructed, registered KD 9168 and BLH 21, both eventually ending up with Pickfords, where at least one remained in service into the early 'fifties. These mighty trucks showed what Scammell could do when they put their mind to it!

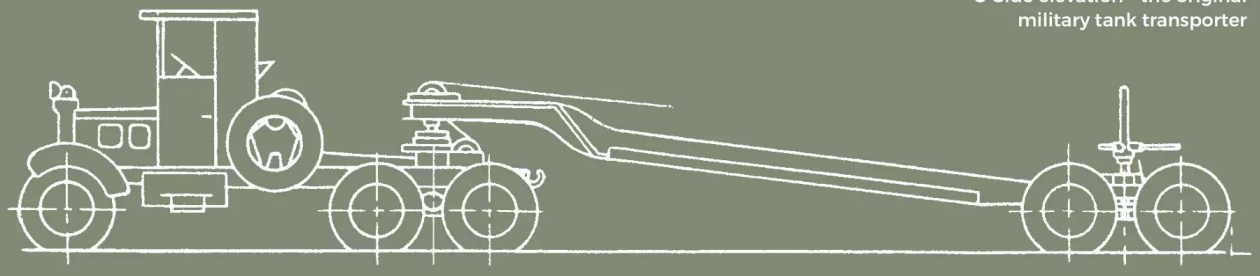
● Dating from 1929, and looking for all the world like a Pioneer on steroids, the Scammell '100-tonner' was a massive chain-drive tractor designed expressly for heavy-haulage work. Just two were constructed, both eventually ending up with Pickfords... although this example is marked as being operated by the Liverpool-based company, Edward Box.

FACTS & FIGURES - MV 5364 - THE ORIGINAL MILITARY PIONEER

Engine: Scammell, petrol		
Cylinders	4	4
Capacity	432in³	7,079cc
Bore and stroke	5 x 5.5in	127 x 140mm
Fuel	68-70 octane petrol	68-70 octane petrol
Power output at 2000rpm	85bhp	63kW
Maximum torque	275 lbf/ft	373Nm

Dimensions and weight		
Overall length	599in	15,214mm
Overall width	108in	2743mm
Height to top of cab	68in	1727mm
Wheelbase	181in	4597mm
Bogie centres	54.5in	1384mm
Ground clearance		
front axle	21in	533mm
rear axle	15.25in	388mm
belly	21in	533mm
Turning circle		
right	74ft	22.51m
left	70ft	21.35m
Weight		
unladen	14.94 ton	15.21 tonne
maximum permissible axle laden weight		
front	3.08 ton	3.14 tonne
rear	14.54 ton	14.8 tonne
semi-trailer bogie	13.34 ton	13.58 tonne
maximum gross train weight	30.1 ton	30.65 tonne

Performance		
Fuel consumption (estimated)	3.5-4mpg	1.24-1.41km/litre
Maximum speed	19mph	30km/h
Maximum grade (solo tractor)	1 in 2	50%



● Side elevation - the original military tank transporter

THE PIONEER ENLISTS

20-ton and 30-ton tank transporters

In November 1935, the War Office placed an order with Scammell for a single heavy artillery tractor based on the Pioneer 6x4 rigid chassis... in December of the following year, this was followed by a contract for 116 artillery tractors, with a total of 980 purchased by the end of WW2. The first contract for breakdown-recovery vehicles was also placed in December 1936, calling for a modest quantity of 10, although, ultimately, more than 2100 were to be procured over the next 10 years.

● 20-ton Pioneer tank transporter with the original low-loading semi-trailer, supplied under contract V3151 dated September 1937. As with the pilot model supplied in 1932, it was necessary to remove the trailer bogie to facilitate loading. This was not an ideal arrangement, and just eight trailers were supplied in this form.

The tank transporter seems to have been something of an 'also ran'... the first order was not placed until 1937, calling for just four, or it may have been five, examples of a 20-ton tractor and low-loading semi-trailer. Possibly the lack of enthusiasm for tank transporters can be explained by the fact that up until 1941, British tanks were still required to conform to restrictions on width and weight that would allow them to be transported by rail and the role of the tank transporter was largely confined to the recovery of battle-damaged tanks. Nevertheless, small deliveries of tank transporters continued throughout the war years. The quantities involved were never large, and total production by 1945, was almost certainly less than 600.

Where MV 6534 had been rated at 18

● Rear three-quarter view of the original riveted-construction 20-ton semi-trailer. The trailer wheels and the rear wheels of the tractor were shod with the same size of tyre (15.00x20in), but the wheels on the steering axle of the tractor were different, necessitating carrying two spare wheels.

● AEC-FWD R6T artillery tractor coupled to a drawbar trailer via a dummy axle. With a Vickers light tank Mk VIB on the trailer, and a tracked carrier on tow, the outfit is operating as a tank-recovery vehicle. The total weight of the load is in the order of 20,000 lb (9090kg).

tons, the new design of tank transporter was described as having a capacity of 20 tons. It was powered by a Gardner 6LW six-cylinder diesel engine, for which, incidentally, the War Office was prepared to pay an additional £150 per vehicle when compared to the price of a Scammell-engined Pioneer.

But, the outfit was described by the War Office as being 'similar to the pilot model supplied in 1932'. Despite being rated at 20 tons, the semi-trailer still had a removable four-wheeled rear bogie that used the same size wheels and tyres as the tractor and was of a very similar pattern to the version supplied with the trials vehicle back in 1932. The vehicle's performance was described as

● Close-up view of the turntable of the redesigned 20-ton semi-trailer, with a near-horizontal loading deck. Note the rubber buffers designed to absorb some of the shock loading of moving away from rest with a loaded trailer.

'satisfactory', but just eight examples were constructed before it was decided that the considerable time and effort of loading could be significantly reduced by providing ramps at the rear that would allow the tank, or whatever was being loaded, to pass over the wheels of the semi-trailer. This meant that the rear bogie could remain attached to the chassis of the trailer. Other changes when compared to the pilot model include the use of a Scammell winch, rather than the Turner machine fitted in 1932.

Performance trials were carried out at the Mechanisation Experimental Establishment (MEE) with what were described, rather grudgingly, as 'satisfactory results'.

The British Army had just two tank transporters available in early 1939, and nine examples had been constructed by the time the British Expeditionary Force set out for France later in the year. One, nicknamed 'Snow White', was famously photographed in Northern France, assigned to the 1st Armoured Division and carrying a Mk IV cruiser tank, but the shortage of tank transporters was so acute at this time that the AEC-FWD R6T heavy breakdown tractor was occasionally pressed into service with a drawbar trailer as a carrier for light tanks.

The next contract (T5103) called for 150 tractors with the redesigned semi-trailer, but just 107 examples were delivered before there were further changes. It had become obvious that the 20-ton rating was not adequate, even for the tanks of the period, let alone when considering future-proofing. Scammell was asked to uprate the tractor and to design a new semi-trailer rated at 30 tons.

Work on the 30-ton version started in November 1938, and the changes to the tractor were apparently confined

● View under the riveted 20-ton semi-trailer. The trailer is loaded with a cruiser tank Mk I weighing almost 30,000 lb (13,636kg). Although probably largely obsolete, these lightly-armoured tanks were used by the 1st Armoured Division in France until June 1940, and in the Western Desert until 1941.

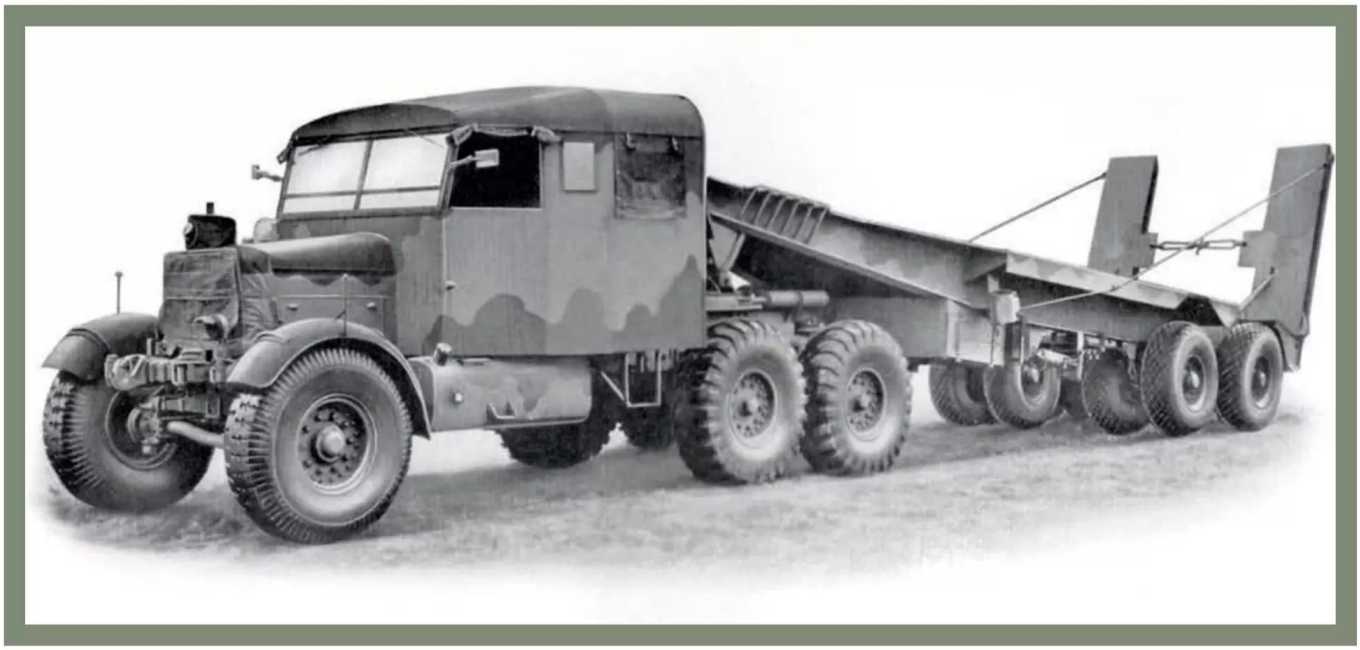
● After just 107 examples of the 20-ton tractor and redesigned semi-trailer had been constructed, all outstanding contracts were cancelled and production turned entirely to the 30-ton outfit. This view, taken up the steep deck of the original 30-ton semi-trailer, shows the long, hinged loading ramps.

to the use of larger tyres on the front axle. However, the semi-trailer was completely redesigned with a long sloping deck, designed to accept the 50% increase in loading. The angle of the trailer deck made the vehicle particularly ungainly when loaded, especially with the (later) M3 Lee/Grant medium tank where the height of the tank, coupled with the height of the trailer, made the outfit susceptible to fouling low bridges.

The first example of the definitive 30-ton machine, still primarily intended as a tank-recovery vehicle, was scheduled for delivery in the autumn of 1939 or early 1940. It was subjected to a two-month trial, during which time it covered 500 miles (800km) of road running loaded to 30 tons. There were problems with the turntable, which were eventually ironed out, as well as further changes made to the loading ramps and the trailer bed, which improved the angle at which the load was carried. The design was adopted from 1940.

Scammell designated the long-wheelbase chassis used for the tank transporter as RP15, and the vehicle was described as the Pioneer TRMU20 – maybe abbreviated from 'tank retriever motive unit' – with the official nomenclature 'transporter, 20 ton, 6x4+8, semi-trailer, recovery'. The trailer, which was permanently attached to the tractor, was designated TRCU20 – perhaps 'tank retriever carrier unit'. The 30-ton tractor was designated as TRMU30, and the trailer TRCU30; the nomenclature became 'transporter,

● Resplendent in disruptive camouflage, consisting of a background green colour, with the pattern applied as areas of black or very dark grey, this early 30-ton outfit shows the steep angle to the deck of the semi-trailer, and the long loading ramps. Note, particularly, the radiator muff.



● Heavily air-brushed rendering of the classic 30-ton outfit, based on the preceding photograph, and taken from the Maintenance Manual published by Scammell on behalf of the War Office. The official title was 'Transporter, 30 ton, 6x4-8, semi-trailer recovery, model TRMU/30/TRCU/30'.

30 ton, 6x4+8, semi-trailer, recovery'. It was, at first, envisaged that the two vehicles would be in production together, and operated according to need, and the chassis numbers certainly suggest that the two types were constructed alongside one another. However, in 1942, the last contract for the 20-ton variant was cancelled and the design was declared obsolete. All future production was of the 30-ton outfit.

Putting aside the fact that the Pioneer could never be constructed in large enough numbers, there is no doubt that it was one of the better British trucks of the WW2 period, particularly when compared to the 20-ton (later down-rated to 15 ton) Albion CX24S which, for a period, was the only other option for tank transporting. However, even as early as 1940, the War Office had started to consider the possibility of commissioning a 40-ton tank transporter and it was not going to be a Pioneer.

Scammell claim that there was a wartime saying – 'when the going gets tough, only a Scammell is good enough' – but, the truth is, the Pioneer was effectively obsolete for much of its service life, and was definitely not 'good enough' when compared to what came here from the USA.

Enter the Diamond T

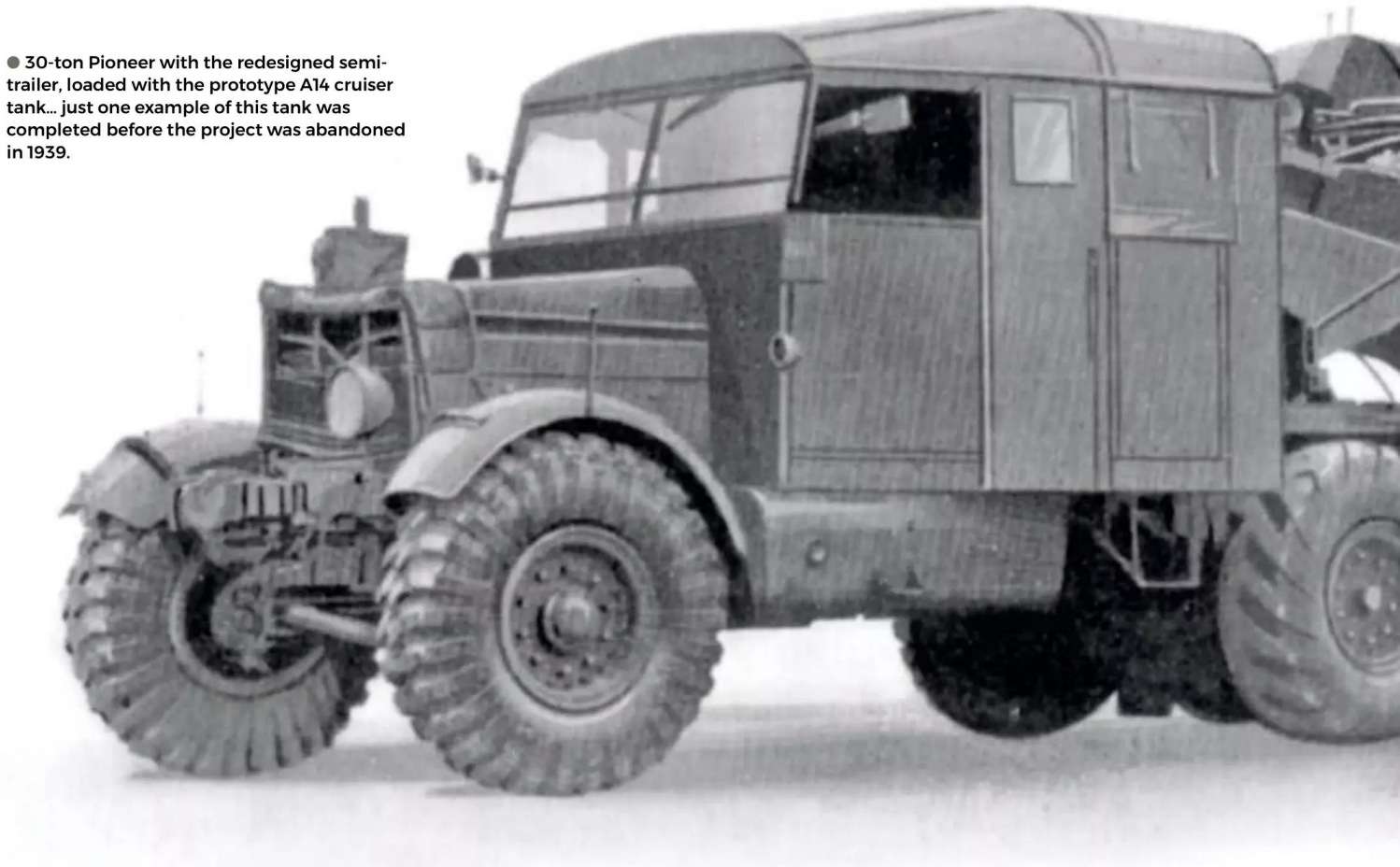
Until the appearance of the Diamond T Model 980 in 1942, the 30-ton Pioneer was the best British tank transporter that was available. However, faced with the 38 1/2-ton battle weight of the Churchill tank, the War Office stated that it would like to see the load-bearing capacity of tank transporters increased to 40 tons. Scammell was decidedly not keen, indicating that considerable redesigning

of the tractor and semi-trailer would be required, and that, anyway, the chassis was possibly not suitable for further development. However, John Crane, of trailer manufacturers Cranes of Dereham, had produced a 40-ton drawbar trailer that was able to carry the Churchill, and this seems to have tipped the balance in favour of a heavy prime mover with a separate drawbar trailer. This arrangement had the advantage that, in extremis, the trailer could be uncoupled from the tractor and winched across a bridge that would otherwise not be able to take the weight of the tractor, trailer and load.

In 1942, at the request of the War Office, Scammell constructed a pair of 40-ton ballast tractors for use with the Dyson 30-ton drawbar trailer. But, at the same time, the American Diamond T company offered the War Office a heavy prime mover, based on an existing truck, which was fitted with a Hercules diesel engine allowing fuel parity with the diesel-powered Scammell. The truck was conservatively rated at 40 tons, and was of a considerably more-modern design than the Scammell... it even had side windows and brakes on the front wheels!

The possibility of a 40-ton Scammell was quietly forgotten and production of the Diamond T Model 980, and subsequently the Model 981, started in 1941, with the first examples available during the following year. The truck quickly became the standard British tank transporter, and was supplied to the British Army in the period 1942 to 1945. A total of more than 2000 examples were constructed.

● Early 30-ton semi-trailers had a steeply-inclined deck, but this was subsequently redesigned so that the deck was nearer to horizontal, as shown here, improving the centre of gravity when loaded. This trailer is carrying a Matilda II infantry tank.



● 30-ton Pioneer with the redesigned semi-trailer, loaded with the prototype A14 cruiser tank... just one example of this tank was completed before the project was abandoned in 1939.

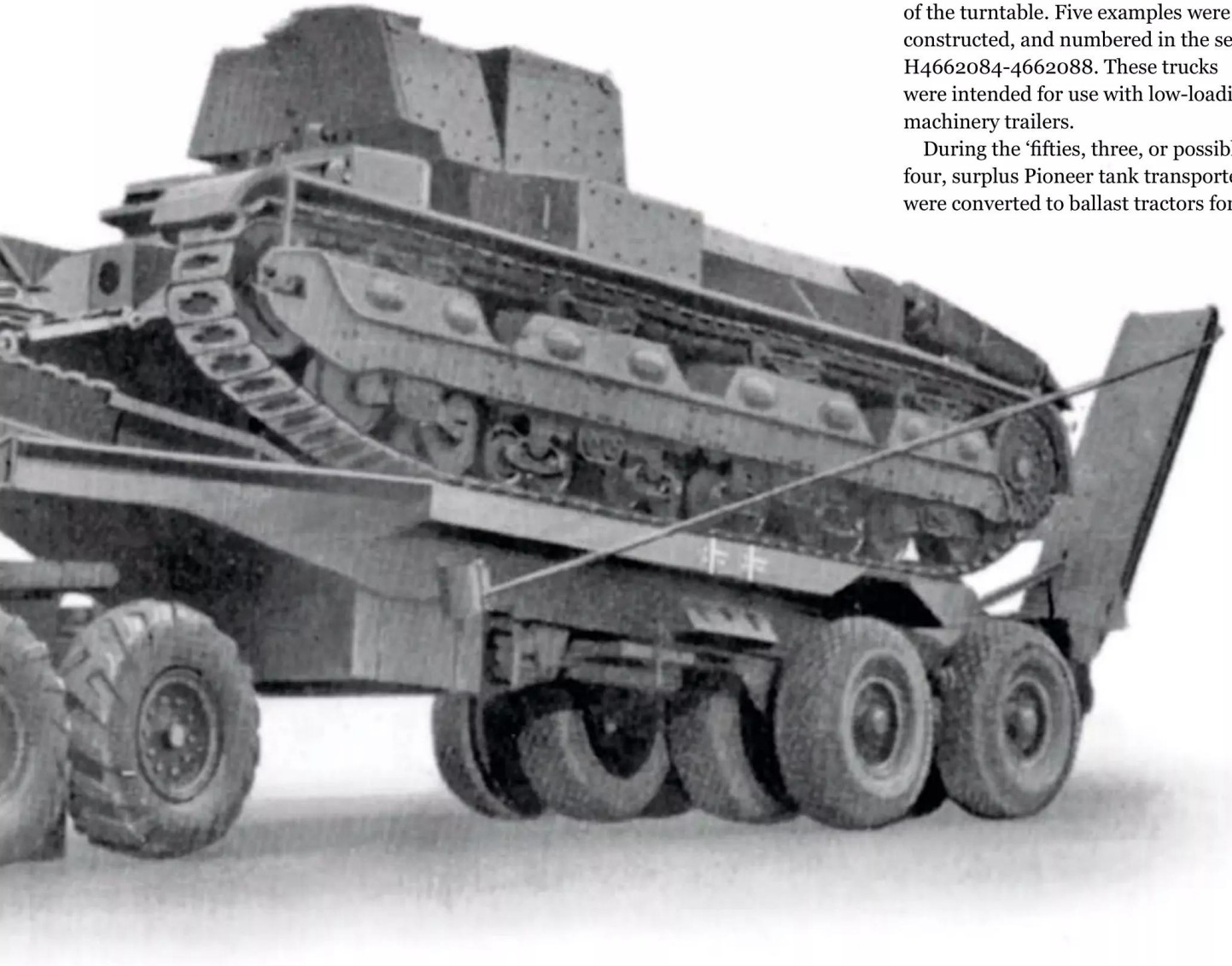
Experimental Pioneer variants

Since the Scammell factory could hardly keep up with demand for the standard tank transporters there was little or no time for finessing the design... however, two types of experimental tractor were constructed during the war years, although there was no series production.

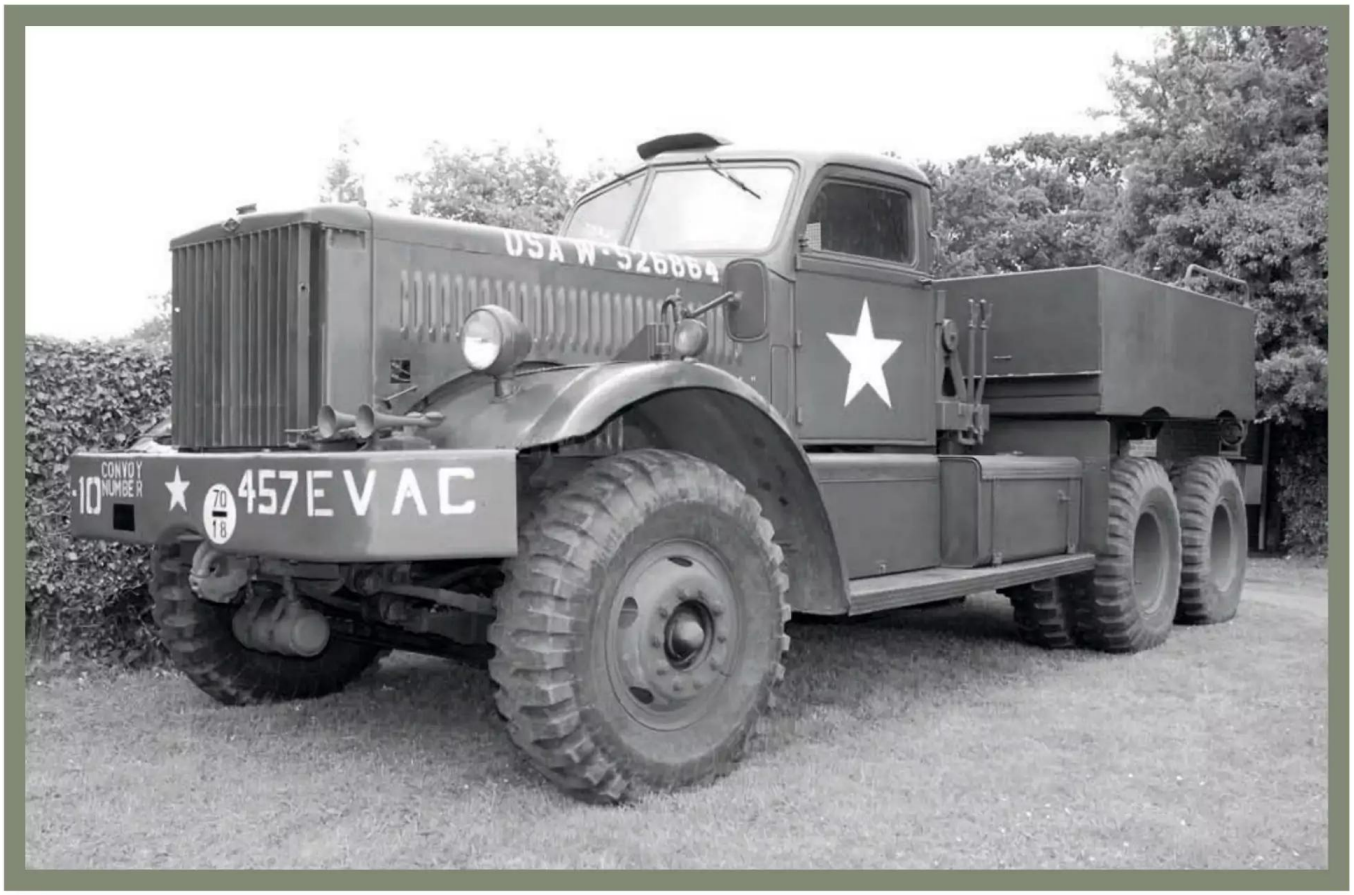
The first was the 40-ton ballast tractor already mentioned, with two examples constructed in 1941, numbered H4575530 and H4575531. It was intended for use with a 30-ton eight-wheeled recovery trailer manufactured by Dysons. The other, rated at a rather odd 27 tons, consisted of the standard tank-transporter chassis, with a steel-framed timber ballast box in place of the turntable. Five examples were constructed, and numbered in the series H4662084-4662088. These trucks were intended for use with low-loading machinery trailers.

During the 'fifties, three, or possibly four, surplus Pioneer tank transporters were converted to ballast tractors for

● **Rear three-quarter view of the 30-ton Pioneer with the original steeply sloping deck. Note the centre-of-gravity markings on the sides of the semi-trailer.**



● Newly-constructed 30-ton Pioneer photographed outside the camouflaged factory buildings at Tolpits Lane, Watford. The site closed in 1988 and was subsequently sold for development.



● The appearance of the 40-ton Diamond T tank-transporter train in 1941/42 brought to an end discussions regarding redesigning the Pioneer to accept more weight. The photograph shows the early closed-cab Model 980, which lacked the ability to winch from the front. The air horns and indicators are a wise addition, but are not original.

● Well-marked closed-cab Diamond T Model 981 (note the winch fairlead rollers in the front bumper), hitched to a 40-ton Mk II British trailer. The official caption states that the vehicle was taking part in 'a recovery exercise'.

● After WW2 was over, REME used heavy concrete blocks to convert a handful of 30-ton Pioneers into ballast tractors for use with engineer's drawbar trailers by 27 Command Workshop REME. They were described as Pioneer R100/2, but were soon superseded by new Scammell Constructors.

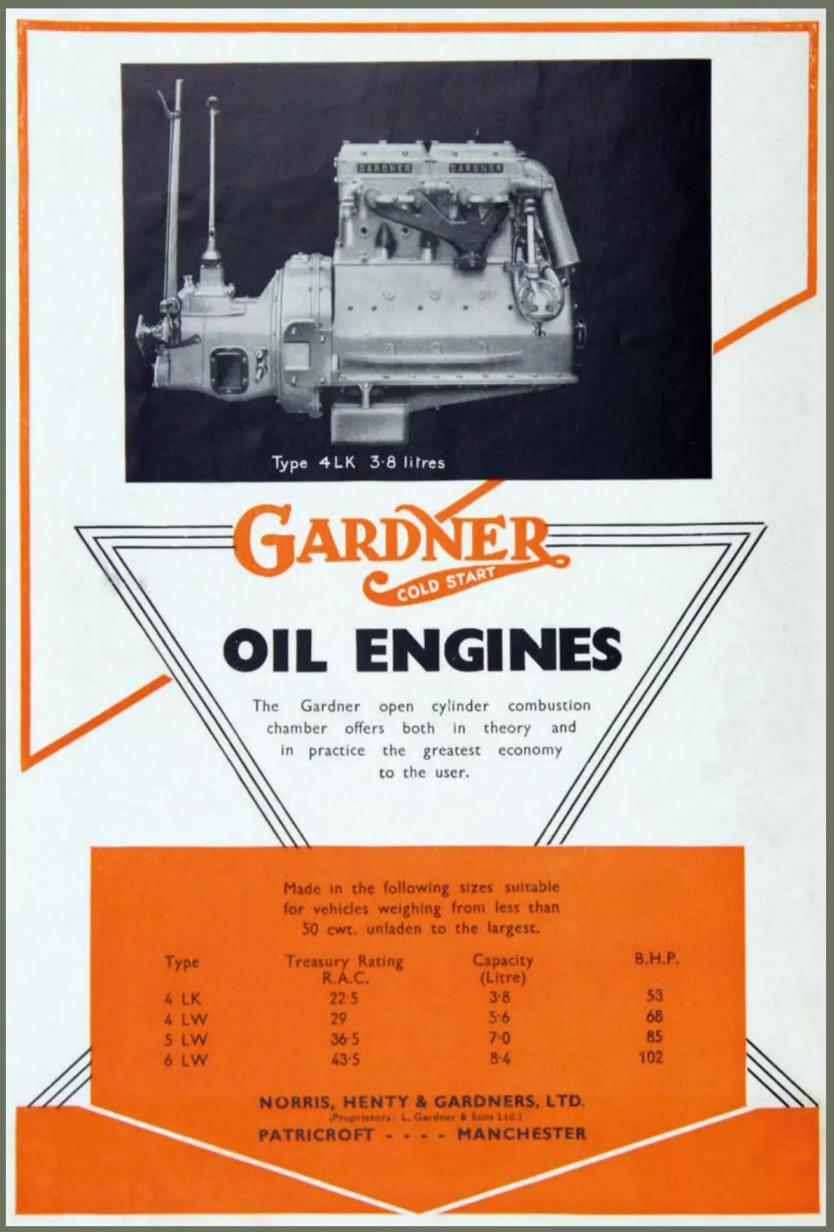
● Nicknamed 'Block Buster', at least one of the Pioneer ballast tractors survived long enough to pass into private hands in the 'fifties.

● The Albion CX24S was supposed to have been operated alongside the Scammell as a tank transporter and recovery vehicle. Some 750 examples were ordered, with deliveries beginning in 1942, but, unfortunately, it was both underpowered and under-braked, and was soon downgraded to 15 tons, and assigned to 'other duties'.

use with engineer's drawbar trailers by 27 Command Workshop REME. Curiously, despite being based on TRMU30 tractors, they were designated R100/2. A steel frame was constructed over the fifth wheel into which six heavy concrete blocks could be stacked, and a small jib was fitted at the extreme rear to allow the spare wheel to be raised or lowered to the ground and to lift the trailer hitch. The appearance of the Rolls-Royce engine Scammell Constructor in 1954 brought the experiment to an end.

Production

All of the Pioneers were built at Scammell's Watford plant, adjacent to Watford West railway station on the branch line from Watford Junction to Croxley Green, and close to the Grand Union canal. The site faced onto Tolpits Lane, with the railway to the left and allotments to the right and behind; these allotments are apparent in many official Scammell photographs. The plant had originally been built to produce the 'six-wheeled tractor-lorry' back in 1922, and it closed in 1988 when DAF and Leyland merged. The site has been redeveloped

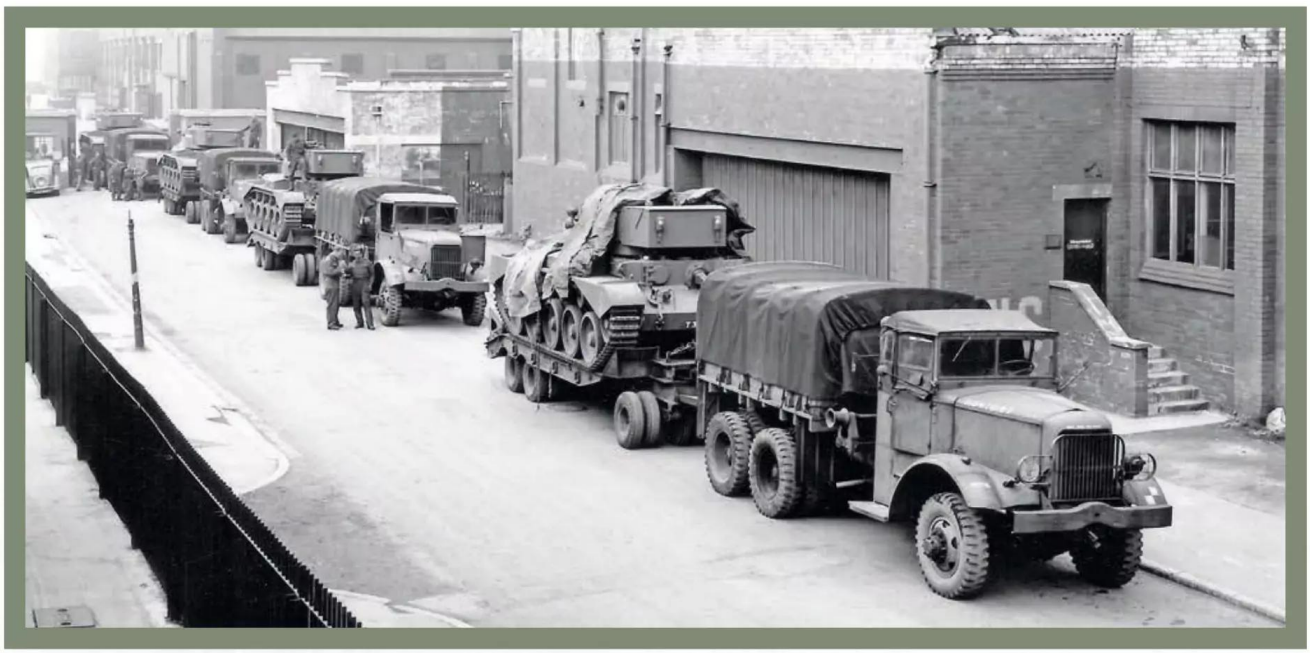

Type 4 LK 3·8 litres
GARDNER
COLD START
OIL ENGINES
The Gardner open cylinder combustion chamber offers both in theory and in practice the greatest economy to the user.
Made in the following sizes suitable for vehicles weighing from less than 50 cwt. unladen to the largest.
Type | Treasury Rating R.A.C. | Capacity (Litre) | B.H.P.
4 LK | 22·5 | 3·8 | 53
4 LW | 29 | 5·6 | 68
5 LW | 36·5 | 7·0 | 85
6 LW | 43·5 | 8·4 | 102
NORRIS, HENTY & GARDNERS, LTD.
PATRICROFT - - - - MANCHESTER

● At least as much credit for the Pioneer's unstoppable performance is down to the performance of the engine. The Gardner LW Series was launched in 1931 and by the time production ended, some 30 or so years later, 90,565 examples had been built, 8378 of them produced between 1939 and 1945.

for housing in the last decade or so, with road names reflecting some of the company's most iconic products, including Scammell Way, Pioneer Way, and Crusader Way.

Production of the hand-built Pioneer was slow, and the total number of tank transporters built was just 582 under 15 contracts dated 1932 to 1944. Of these, 115 were rated at 20 tons, and 459 rated at 30 tons; there were also eight experimental variants, including the original 18-ton pilot model, and conversions of standard vehicles to produce two 40-ton ballast tractors, and five 27-ton ballast tractors. The contract price for each tank transporter supplied typically varied between £4021 for vehicles supplied in 1940 under contract T8061, to £2720 for vehicles supplied under contract T5162 during the following year.

The engines were produced by L Gardner & Sons Limited at that company's Barton Hall Engine Works, and were sold through Norris Henty & Gardners of Patricroft, Manchester, an arrangement which had started in 1912, when Gardners took an interest in Norris & Henty. The arrangement



● Photographed at the Leyland works in 1944, a convoy of four Mack NM5 tractors, with drawbar trailers, line up to deliver newly-manufactured A34 Cromwell tanks. The combat weight of a Cromwell was 78,800 lb (35818kg), rather more than could be handled by even a 30-ton Pioneer.

● Looking rather like the Diamond T's younger brother, the Federal 604 was a 20-ton 6x4 tractor for semi-trailer, powered by a Cummins engine, and co-produced by Reo as the Model 28XS. A total of 450 examples were purchased under contract SM2149.

● Rated at 18 tons, the White-Ruxtall 922 was typical of the ex-French contract vehicles that were diverted to Britain in 1940, after the fall of France, and fitted with locally-made bodies to carry light tanks, such as this 19-ton Crusader II, which weighed in at 42,560 lb (19,345kg). Nearly 250 were in service during 1941/42, but they were quickly found to be obsolete in this role and were converted to cargo vehicles.

continued until 1962, when the marketing company became Gardner Engine Sales Limited.

All of the 20-ton semi-trailers were constructed by Scammell, but the 30-ton variant was built both by Scammell and Shelvoke & Drewry, a Letchworth-based (peacetime) producer of municipal vehicles. In fact, in an effort at getting around the shortage of vehicles, some of the 20-ton tractors were converted to 30 tons by virtue of being retro-fitted with Shelvoke & Drewry trailers.

Other tank transporters

Although the most numerous and successful of the British Army's tank transporters during WW2, the Pioneer and the Diamond T did not have the field entirely to themselves. There were similar offerings from Albion, Federal, and the American truck company, Mack.

Albion's offering was the CX24S, a six-wheeled tractor and semi-trailer combination originally rated at 20 tons, and powered by an Albion EN248B 10.5-litre six-cylinder engine. Some 750 examples were ordered, with deliveries beginning in 1942. Unfortunately, it proved woefully inadequate, being both underpowered and under-braked, and was soon downgraded to 15 tons, and ignominiously assigned to carrying cable drums and telephone poles.

Looking rather like the Diamond T's younger brother, the Federal 604 was a 20-ton 6x4 tractor for semi-trailer, powered by a Cummins engine, and co-produced by Reo as the Model 28XS. Records suggest that 450 examples were purchased under contract SM2149; many went to Canada and Australia.

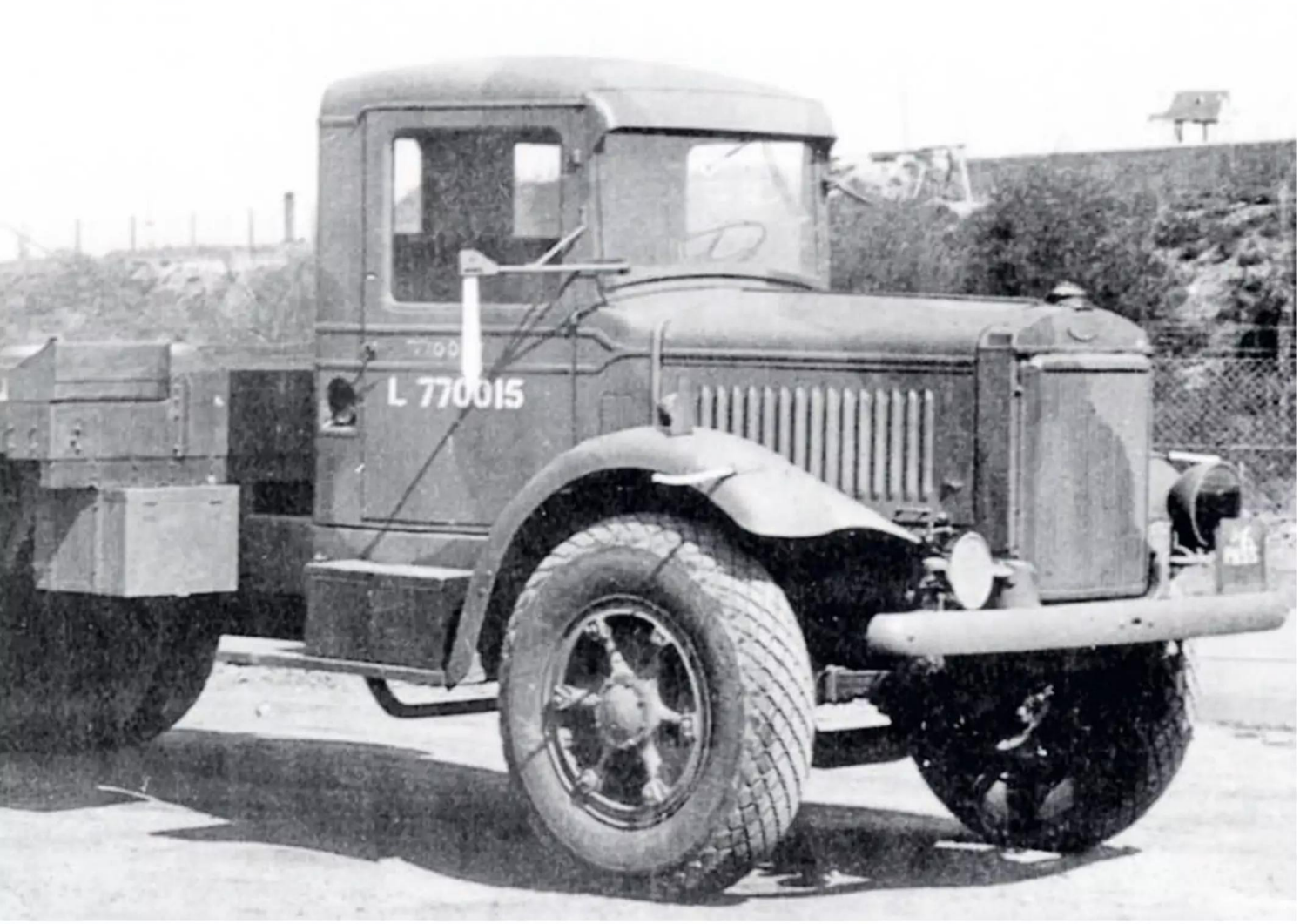
More impressive, was the tank-transporter conversion of the Mack NM5 cargo truck, either used in conjunction with a drawbar trailer, or converted to a tractor with the addition of a fifth wheel to be used in conjunction with the semi-trailer of the hapless Albion CX24S. Despite the advantage of all-wheel drive, the truck lacked the overall 'grunt' of both the Pioneer and the Diamond T. Nevertheless, period photographs show the vehicle being used to shift new tanks from the factory to the storage depots.

Early in the war, there were small numbers of 13- and 18-ton flatbed trucks from American manufacturers Mack, White and White-Ruxtall, some

● Also rated at 18 tons, the White 920 was another ex-French contract vehicle, converted to a tank carrier. The load is a Crusader cruiser tank, the flat disk wheels suggesting that it could be the prototype.

● The Mack EXBX was originally ordered by France as a fuel tanker, but was diverted to Britain and converted to an 18-ton tank carrier. Note the typically American cast wheels at the front.

● White 920 with 'bee's knees' folding ramps, loaded with an A13 cruiser tank Mk IV. It's a tight fit... and I wouldn't care to imagine the outcome of an emergency stop!



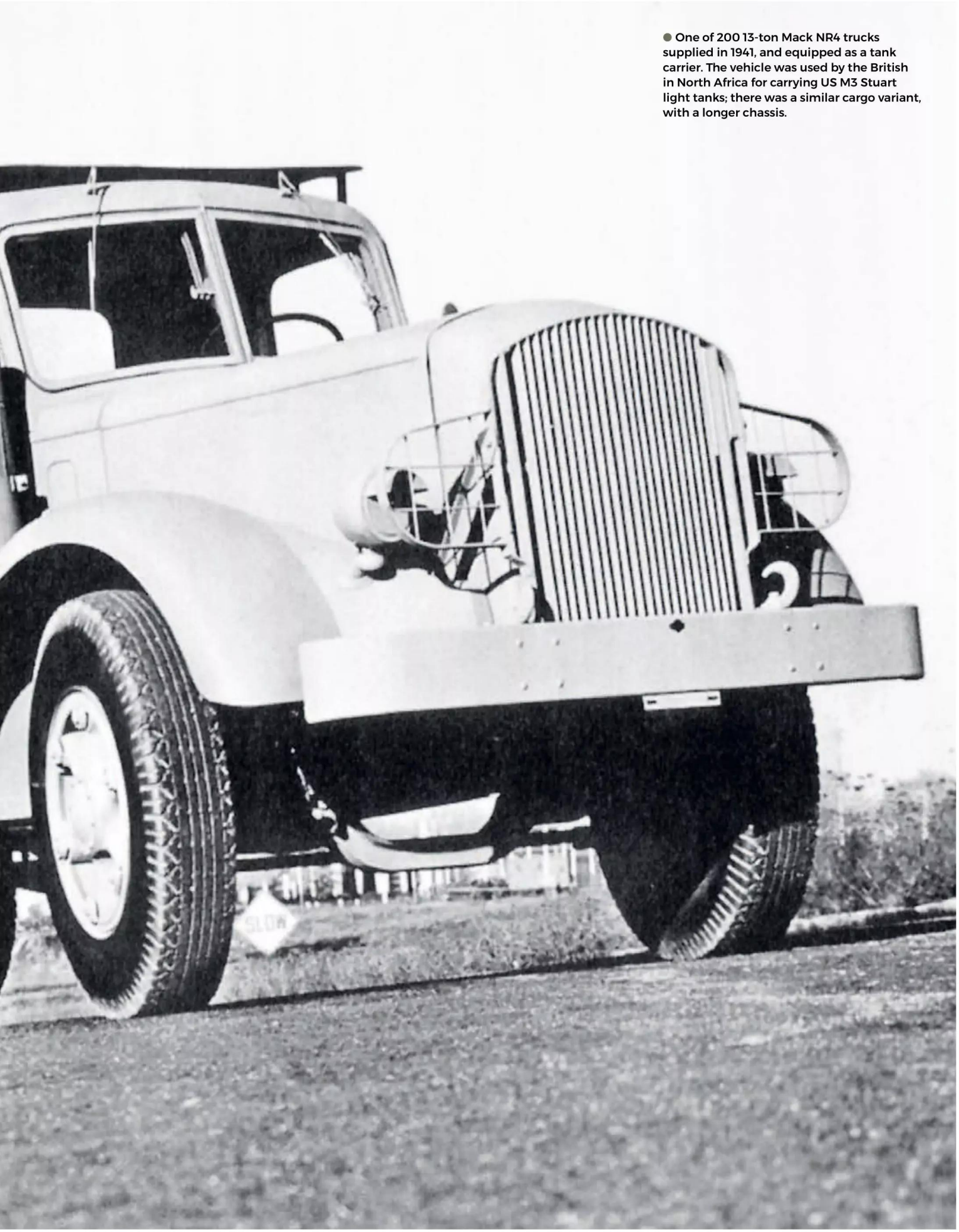
of which were diverted to Britain from French contracts. Fitted with British-built bodies that incorporated folding, or removable, rear loading ramps, these trucks were initially used to carry light tanks, but were apparently quite useless in soft sand, and were quickly converted to the cargo role.

The commercial Pioneer returns

All outstanding production of military Pioneers was cancelled following VE Day. However, the old Pioneer wasn't quite dead, and, despite the principles of the design being some 25 years old, it remained in Scammell's catalogue until at least September 1954. In an eight-page leaflet entitled 'There's a Scammell for every type of load', the 30-ton Pioneer, complete with the 30-ton semi-trailer, was described as having been 'used by fighting services for recovery of disabled heavy tanks'. By this time, the name Pioneer had been dropped, and the vehicle was described as the 'Military 14 tank transporter' – presumably referencing the vehicle's 14 wheels. Whether or not any were sold, is another matter altogether.

The leaflet also illustrated a Pioneer 6x4 breakdown-recovery tractor that was described as Explorer – even though that name belonged to a different chassis entirely!

It has also been suggested that commercial buyers were being offered what had been partially-completed tank-transporter tractors that had originally been intended for military service. Constructed with a wider, more highly-finished crew cab, a large ballast body for heavy haulage, and an unsprung front tow hitch, these machines were described as the Pioneer 80, on account of their (civilian) 80-ton (81.5 tonne) rating. Examples were certainly fielded by Red House Motor Services, Edward Box, and Pickfords, who, in passing, also converted some ex-military Pioneers to a similar specification.



● One of 200 13-ton Mack NR4 trucks supplied in 1941, and equipped as a tank carrier. The vehicle was used by the British in North Africa for carrying US M3 Stuart light tanks; there was a similar cargo variant, with a longer chassis.

DISCERNING OPERATORS CHOOSE SCAMMELL

The " Explorer " " Mountaineer," and " Constructor " vehicles have earned a high reputation for their exceptional cross-country performance in all parts of the world. The rugged simplicity, multi-wheel drive, power assisted steering and axle articulation enable these machines to be operated under the most arduous conditions.

The " Explorer " has been specially designed to provide exceptional axle articulation which enables the machine to operate in conditions quite impossible for normal off the road wheeled vehicles.

The " Mountaineer " is a medium load capacity chassis of rugged construction and is available in three wheelbase lengths, as may be required for Dump Trucks, Tractors, Load Carriers or Motive Units for Heavy Duty Articulated Transporters.

The " Constructor " has been developed to provide maximum cross-country and highway performance whilst carrying an exceptional heavy payload. It can be supplied in the same types as the " Mountaineer," but the design of the chassis, which incorporates the special double drive bogie axle, enables much greater loads to be transported.

We cannot attempt to illustrate in this catalogue all of the many designs in the Scammell Range, which embraces vehicles with from 4 to 32 wheels, having load carrying capacities from 11,000 lbs, to 336,000 lbs, so we have depicted typical examples for our basic types.

OILFIELDS 12' Wheelbase 4 x 2 Motive Unit. Fitted with fifth wheel turntable for attaching semi-trailers. Load capacity 33,000 lbs.

" CONSTRUCTOR " 6-wheel drive 15' 9" Wheelbase Motive Unit. Fitted with winch and fifth wheel turntable for attaching semi-trailers. Load capacity up to 168,000 lbs.

" CONSTRUCTOR " 6-wheel drive 21' 9" Wheelbase Full Oilfields Truck. Fitted with winch, tail roller, headache rack and gin poles. Load capacity 40,000 lbs.

" MOUNTAINEER " 4 wheel drive Tanker for 2,500 Imp. Gals. Petrol/Salt water. Discharge by power driven pump through flowmeter.

" MOUNTAINEER " 4 wheel drive Motive Unit with Flat Platform Semi-Trailer. Load capacity 56,000 lbs.

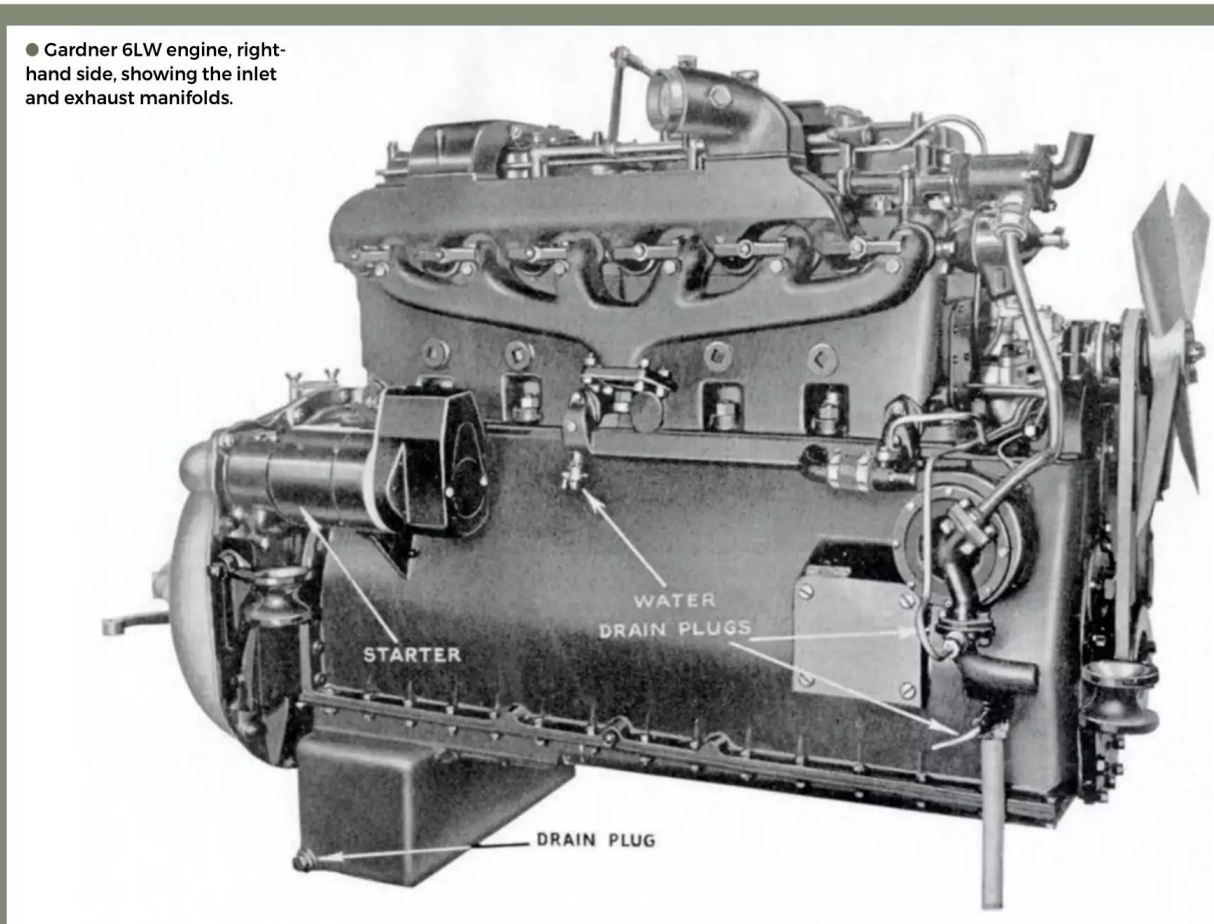
" MILITARY 14 TANK TRANSPORTER." Used by Fighting Services for recovery of disabled heavy Tanks. 33,000 direct pull winch. Load capacity 68,000 lbs.

● Scammell sales brochure dating from 1954 showing at bottom right, that the old Pioneer tank transporter was still available... albeit now described as the 'Military 14', presumably in recognition of having 14 wheels. The load capacity was said to be 68,000 lb (30,909kg)... just a gnat's whisker over 30 tons, and considerably less than the weight of the average tank in 1954.

DIESEL POWER AND WALKING BEAMS

The Pioneer described

In June 1947, in a long and detailed descriptive article, the '*Automobile Engineer*' magazine described the Pioneer tank transporter as consisting of 'a six-wheeled motive unit with four-wheel drive and a superimposed trailer having eight wheels in a double bogie'... an excellent and pithy description! The article went on to say that the tractor was 'intended to carry tanks up to a maximum weight of 30 tons'... what it didn't say was just how effectively Scammell had managed to pull together the visual aspects of the design. There was nothing flash about the truck, and it looked for all the world like a big, friendly sheepdog, but there was an essential 'rightness' about its appearance.



● Gardner 6LW engine, right-hand side, showing the inlet and exhaust manifolds.

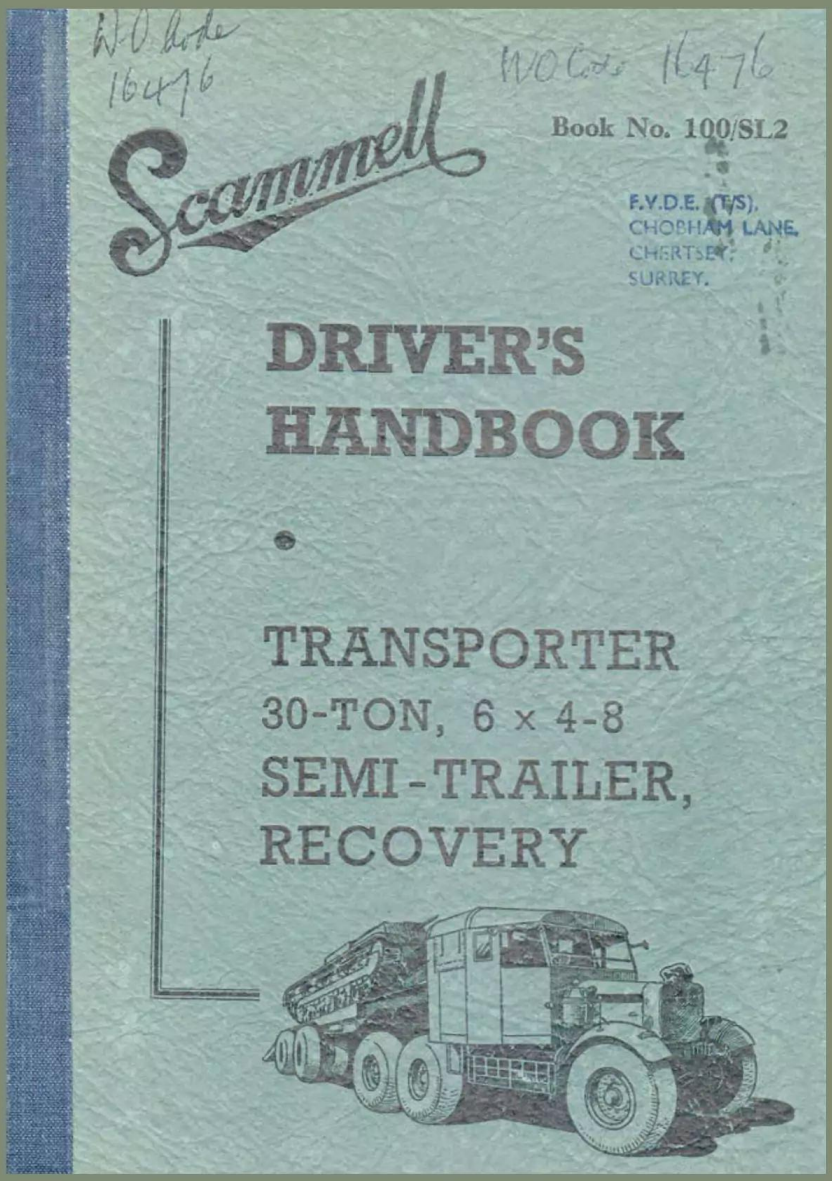
Under the bonnet, like all of the military Pioneers, the TRMU20 and the TRMU30 were both powered by a long-stroke Gardner 6LW six-cylinder direct-injection four-stroke diesel engine. The engine produced a governed 102bhp at a lazy 1700rpm, from a capacity of 8369cc. Introduced into production in 1931, the LW Series was the first engine to be built by L Gardner & Son specifically for automotive applications, previous products of the Gardner company having been for railway, marine or industrial use. The first military LW Series engine was a 4LW installed in a Guy 3-ton truck, and the Mechanisation Experimental Establishment (MEE) went out of its way to praise the engine's easy starting characteristics.

The engine was of modular

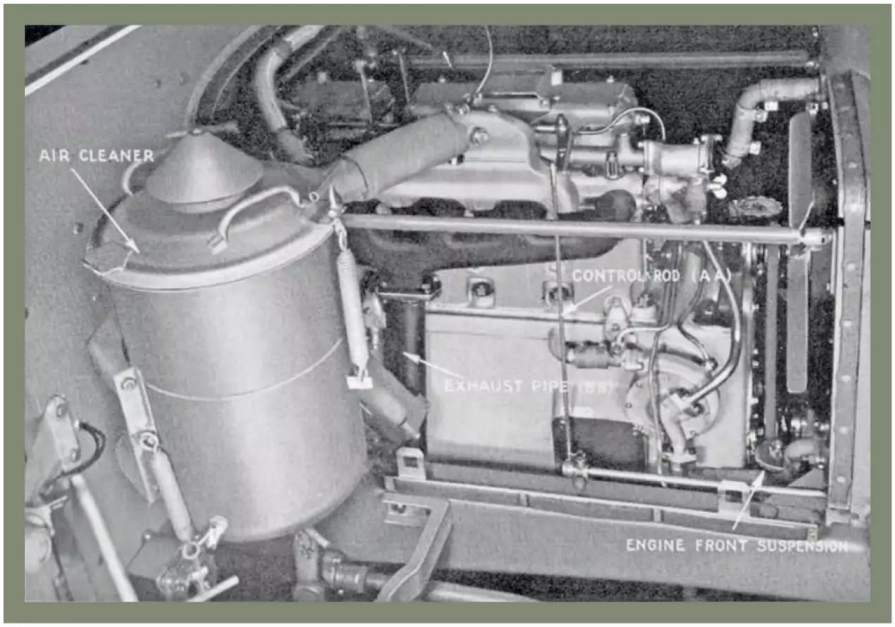
construction, cast with blocks of two or three cylinders, and was eventually offered in two-, three-, four-, five-, six-, and eight-cylinder configurations. It quickly acquired a reputation for hard work and excellent reliability. Early engines of the LW Series were cast with an aluminium crankcase and dry liners, but a shortage of this material during the war meant that many of the engines destined for the Pioneer were of cast-iron construction. The LW Series was a favourite with both bus and truck manufacturers, and remained in production until 1979, by which time a total of 90,565 examples had been built, some 8378 of them produced in the years 1939 to 1945.

Twin CAV injection pumps were provided to introduce fuel into the engine, with one nozzle per cylinder. At 13:1, the maximum compression ratio was sufficient to produce a temperature of 600°C (1112°F) in the compression chamber, which was more than enough to ignite the fuel oil. And, although the 6LW was always considered easy to start in cold conditions, an ether carburettor was provided for starting at, or below, 16°F (-9°C). The holder for the ether capsule was fitted to the central frame of the windscreen, inside the cab, and the carburettor itself was on the engine air intake.

The engine was coupled to the rear wheels via a 16in (400mm) Borg & Beck single dry-plate clutch and a six-speed constant-mesh gearbox with pressure lubrication. The power to weight ratio of the tank transporter was low, requiring



● Driver's Handbook, WO Code 16476, Scammell Code 100/SL2. This 80-page booklet describes the primary characteristics of the Pioneer, and details daily tasks and other regular maintenance to be undertaken by the crew.



a reduction in gear ratios when compared to those used for the artillery tractor and the recovery vehicle. In first gear, with a ratio of 7.12:1, the overall reduction, measured at the wheels, was 182:1, with 232:1 in reverse! A power take-off on the nearside of the gearbox was used to drive the winch.

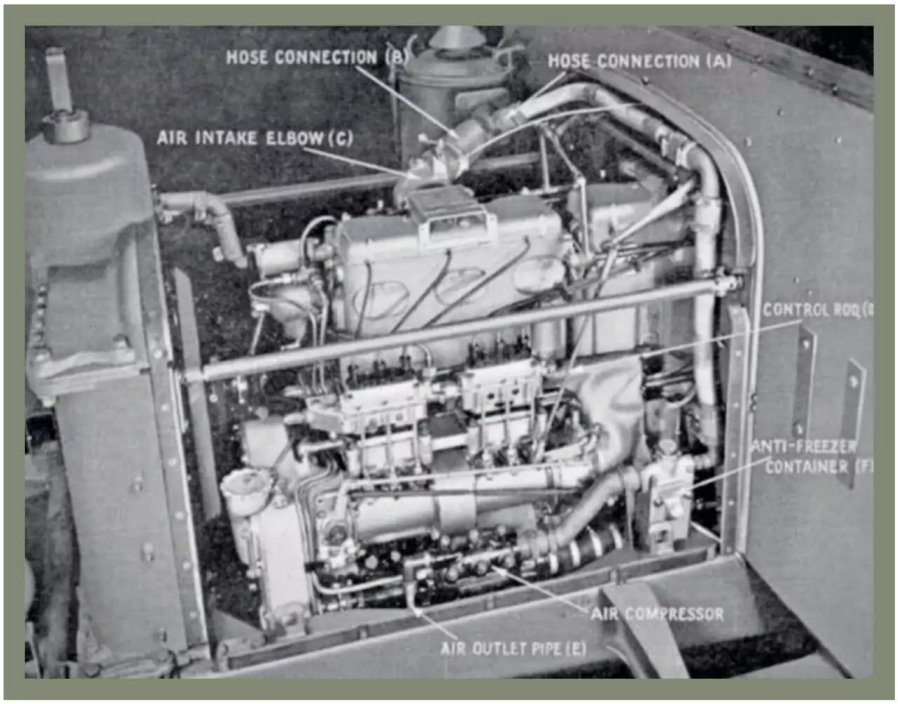
As with the earliest Pioneers, the front axle was centrally pivoted on a perch bar in such a way as to permit it to rock by 12in (305mm) in either direction without imposing torsional loads onto the chassis. The axle was carried on a

● Right-hand under-bonnet view showing the engine in place. Note the massive oil-bath air cleaner, which required draining and cleaning every 3000 miles (4850km).

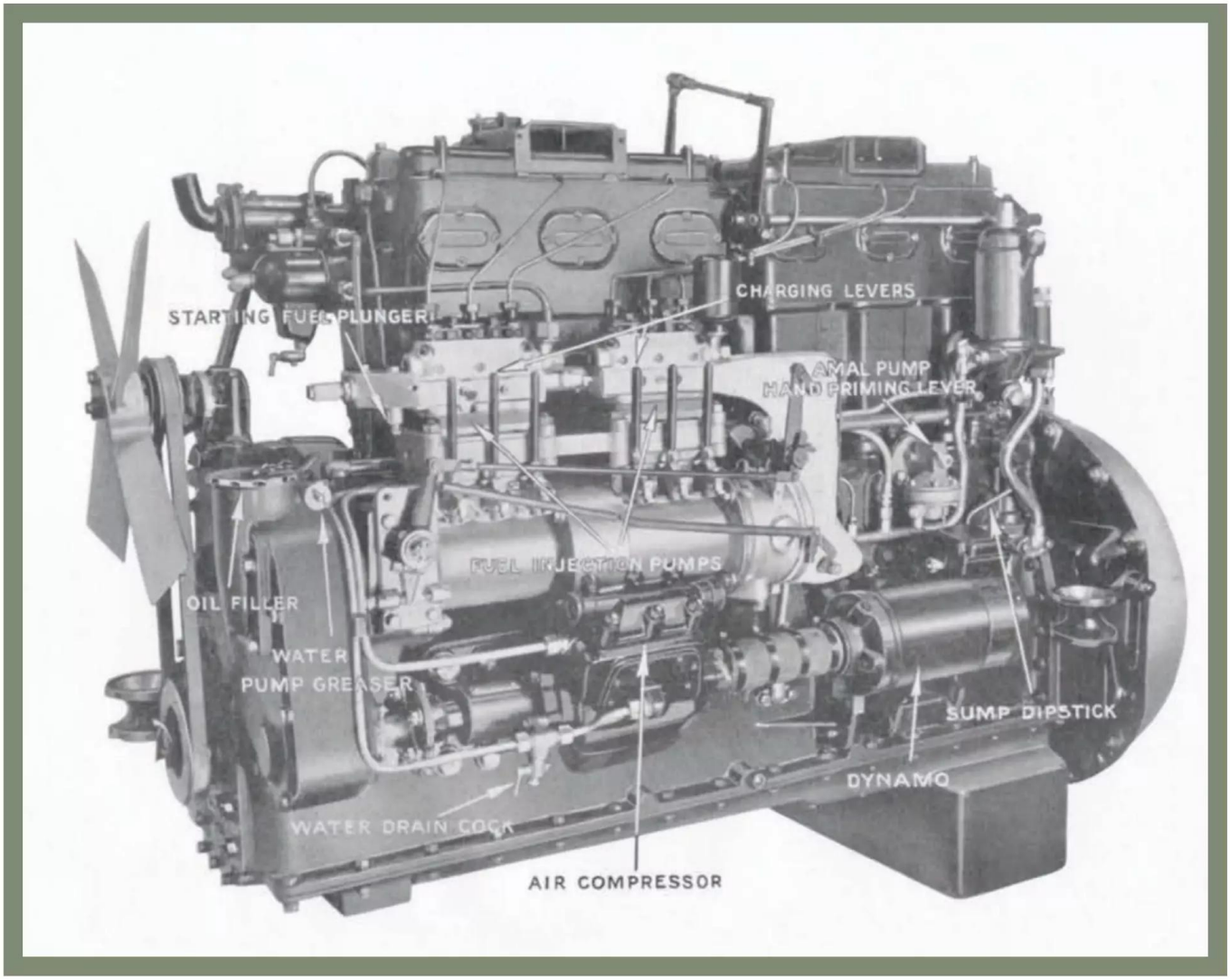
single eight-leaf semi-elliptical spring that was permitted to flex by virtue of being pin-jointed to the offside stub-axle swivel jaw and being supported on a slipper pad on the nearside. Unlike the prototype Pioneers which had used a straight axle at the front, by this time, the front axle was a 3 1/2in (90mm) diameter curved tube with a substantial steering knuckle bolted to a flange at each end. Astonishingly, there were no front-wheel brakes.

The front mudguards were attached to the hubs, allowing them to oscillate with the axle, thus obviating problems with clearances. Ball-tipped marker posts on the mudguards were provided to help the driver judge the width of the vehicle.

Scammell and MWEE both conducted experiments with all-wheel drive Pioneers during the war, converting both artillery and recovery tractors, but such a configuration was not adopted for production.

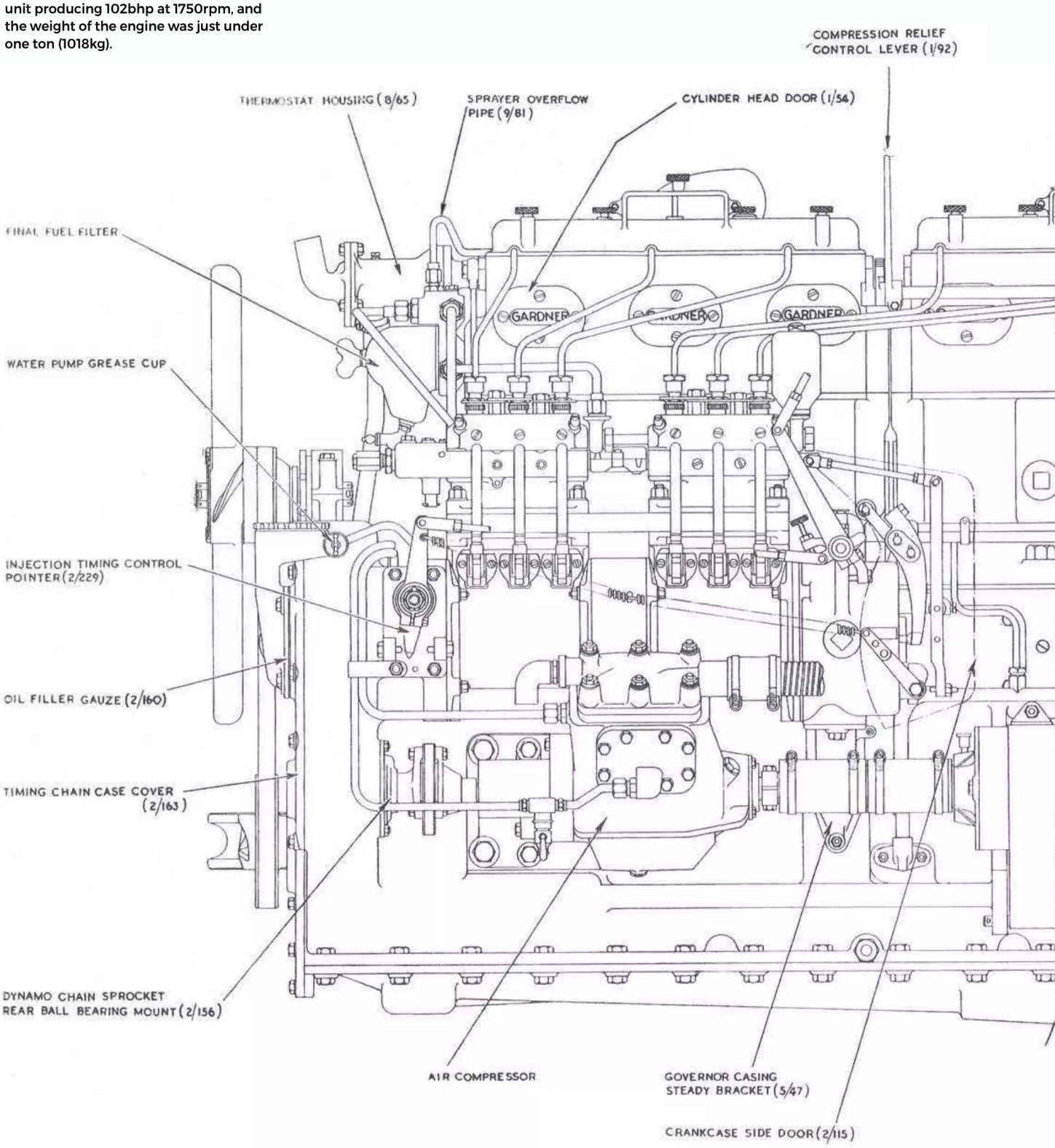


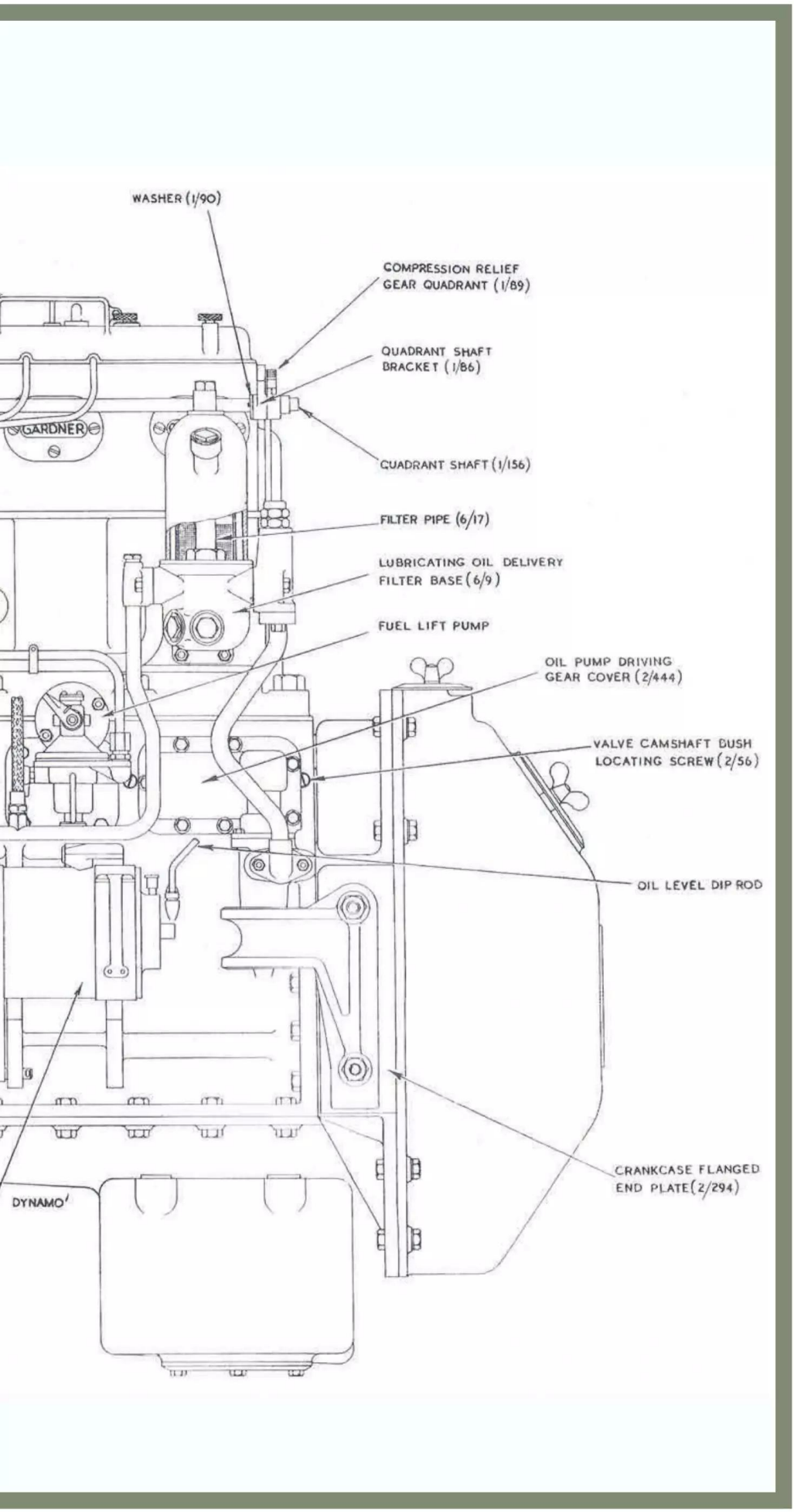
● Left-hand under-bonnet view showing the engine in place. Note the distinctive radiator 'teapot' and water-level indicator to the upper left of the photograph.



● Left-hand view of the Gardner 6LW engine showing the fuel-injection equipment. The engine oil filler is at the bottom right of the photograph... an oil change, which was called for every 3000 miles (4850km), required a massive four gallons (18 litres) of WD 30HD oil.

● Line drawing of the left-hand side of the engine identifying various features. The Gardner 6LW was a direct-injection unit producing 102bhp at 1750rpm, and the weight of the engine was just under one ton (1018kg).





At the rear, Scammell's famed walking-beam axle was near enough identical to that fitted to the pilot tank transporter, with a 9in (229mm) worm and wheel and differential assembly. Walking-beam gear cases, were fitted onto the axle and were free to oscillate by 12in (305mm), either up or down, regardless of what was happening to the wheels on the other side of the vehicle. This feature, combined with the unstoppable nature of Gardner's LW Series engine led '*Automobile Engineer*' magazine to state that the truck 'put up a better performance on rough and soft ground than might be expected'... maybe that might be considered as damning by faint praise, but the Pioneer was surprisingly difficult to get stuck.

The rear brakes were operated mechanically, with air-pressure assistance. The User Manual pointed out that in the event of a failure of the compressor or any of the servos, 'the brakes on the motive unit can still be operated but considerable force is necessary... and the brakes will not be very efficient'. A comforting thought when there were no front brakes and the, unloaded, tractor and trailer weighed more than 15 tons! A hand-operated Neate brake was interconnected with the foot brake and there was a contracting-shoe transmission brake, operating on a drum at the back end of the gearbox, for holding the vehicle when stationary.

When compared to the artillery tractor and recovery variants, the tank transporter was constructed on what would be considered a long-wheelbase chassis, with the main members boxed to help handle the loading. The wheelbase dimension measured up at 180in (4575mm) rather than 146in (3708mm), and larger rear tyres were fitted which increased the wheelbase of the tractor bogie to 54in (1378mm) from a more modest 51in (1302mm).

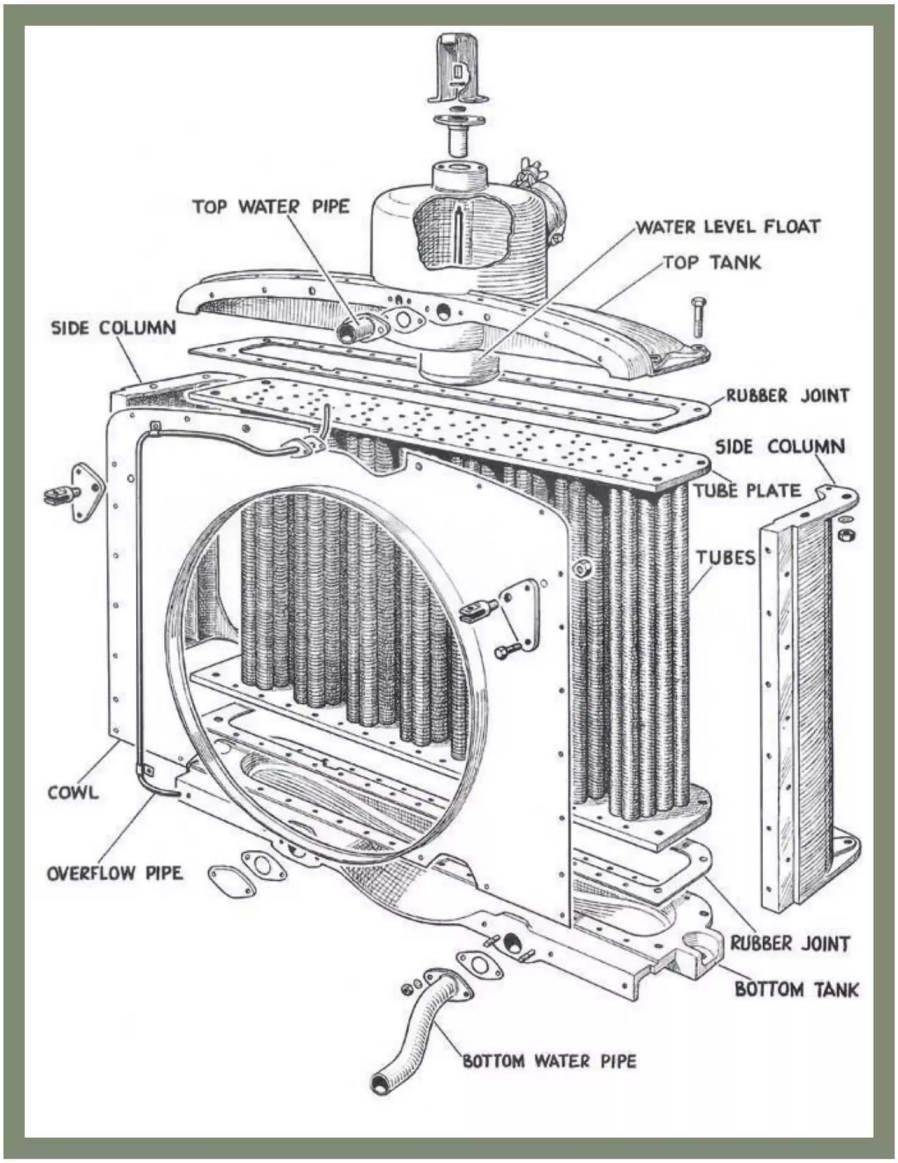
This extended wheelbase allowed the use of a longer cab, with seating for three up front, and an additional four men on a bench seat behind. With its roll-up canvas covered side windows and decidedly coach-built look, the cab could be considered to be charmingly retro... although, at the time, would probably have been described as decidedly archaic in appearance.

The front portion of the cab, and the engine compartment, which consisted

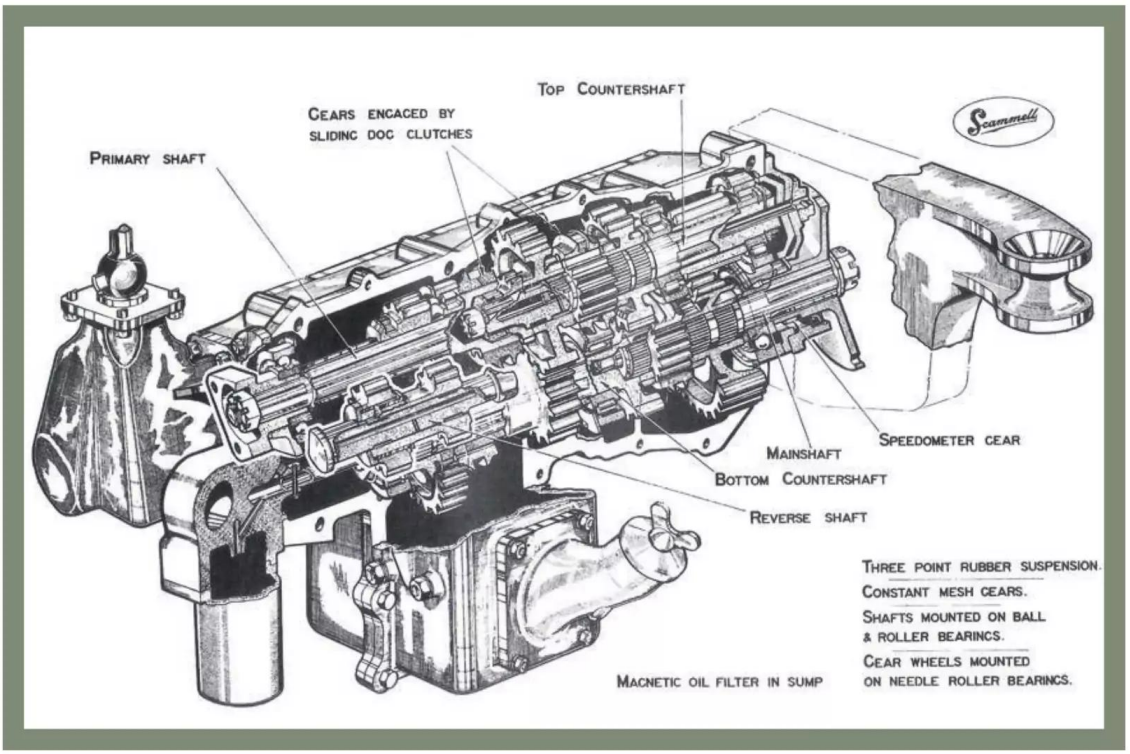
of a fixed top panel with hinged and removable side covers, were identical to the other military Pioneers. The cab was constructed on a timber frame, using flat sheet-metal panels and a simple curved roof, with a pair of side-hinged half doors on either side. Small glazed areas were set into the panel between the two doors on each side, and a large semaphore indicator was also fitted into this panel on the left-hand side. The lower lights of the four-piece flat-glass windscreen could be opened for ventilation. Some vehicles were provided with a roof hatch that allowed the use of an anti-aircraft gun. The cab was effectively open to the rear, but there was a half-height partition and a roll-up canvas cover to exclude the worst of the weather.

A huge air cleaner, of either pressed or cast construction, was tucked into the angle formed between the bonnet and the engine bulkhead on the right, and a large stowage basket was fitted beneath the cab, also on the right-hand side, for carrying the rear-wheel tracks and other items. On the nearside, this position was allocated to a 50-gallon (225 litre) fuel tank with a step to help the driver mount the beast, and an integral fuel-level gauge.

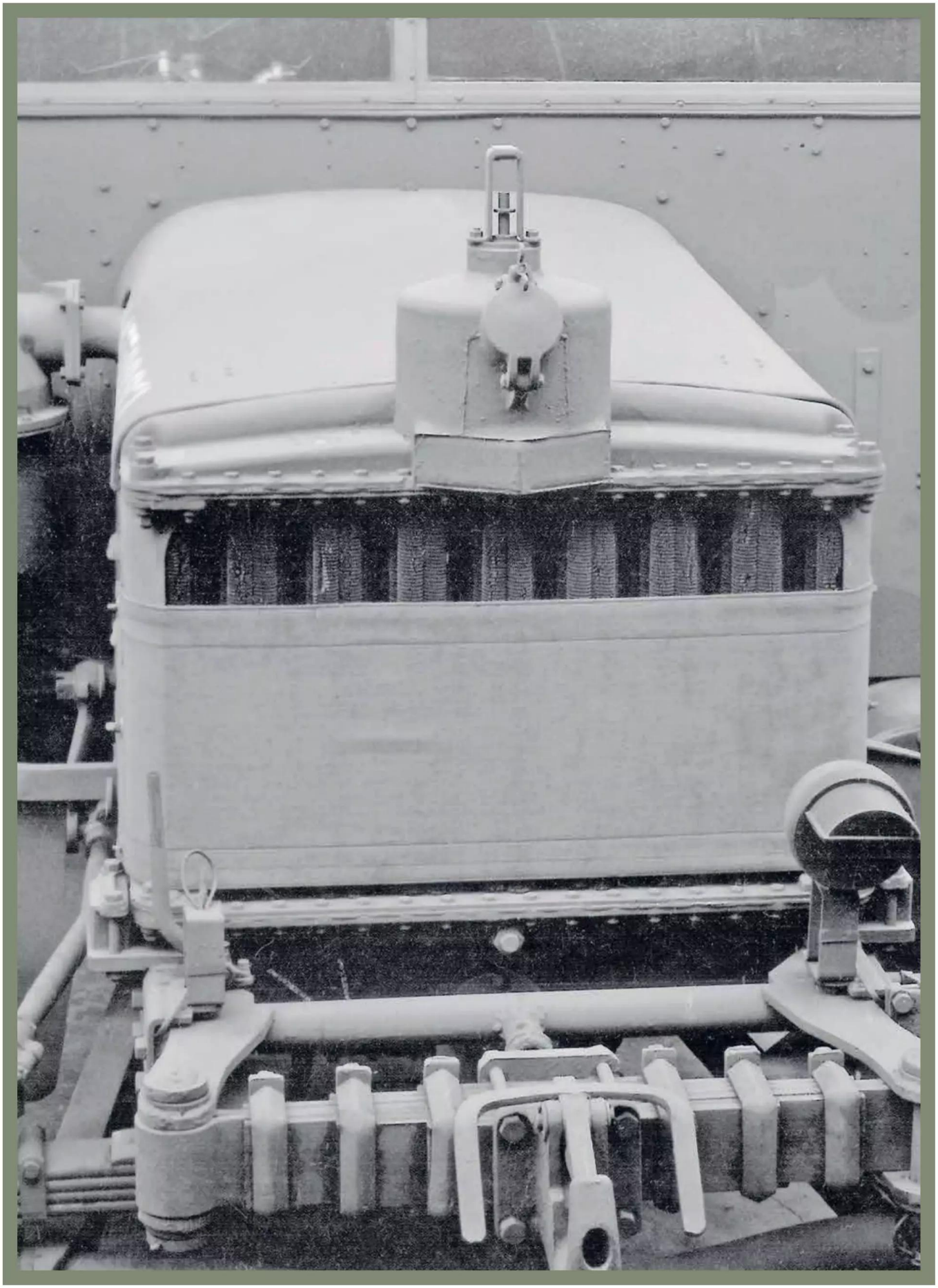
Behind the cab was the air receiver for the braking system, and the Scammell turntable – or fifth wheel – coupling for the semi-trailer. Unlike a modern fifth



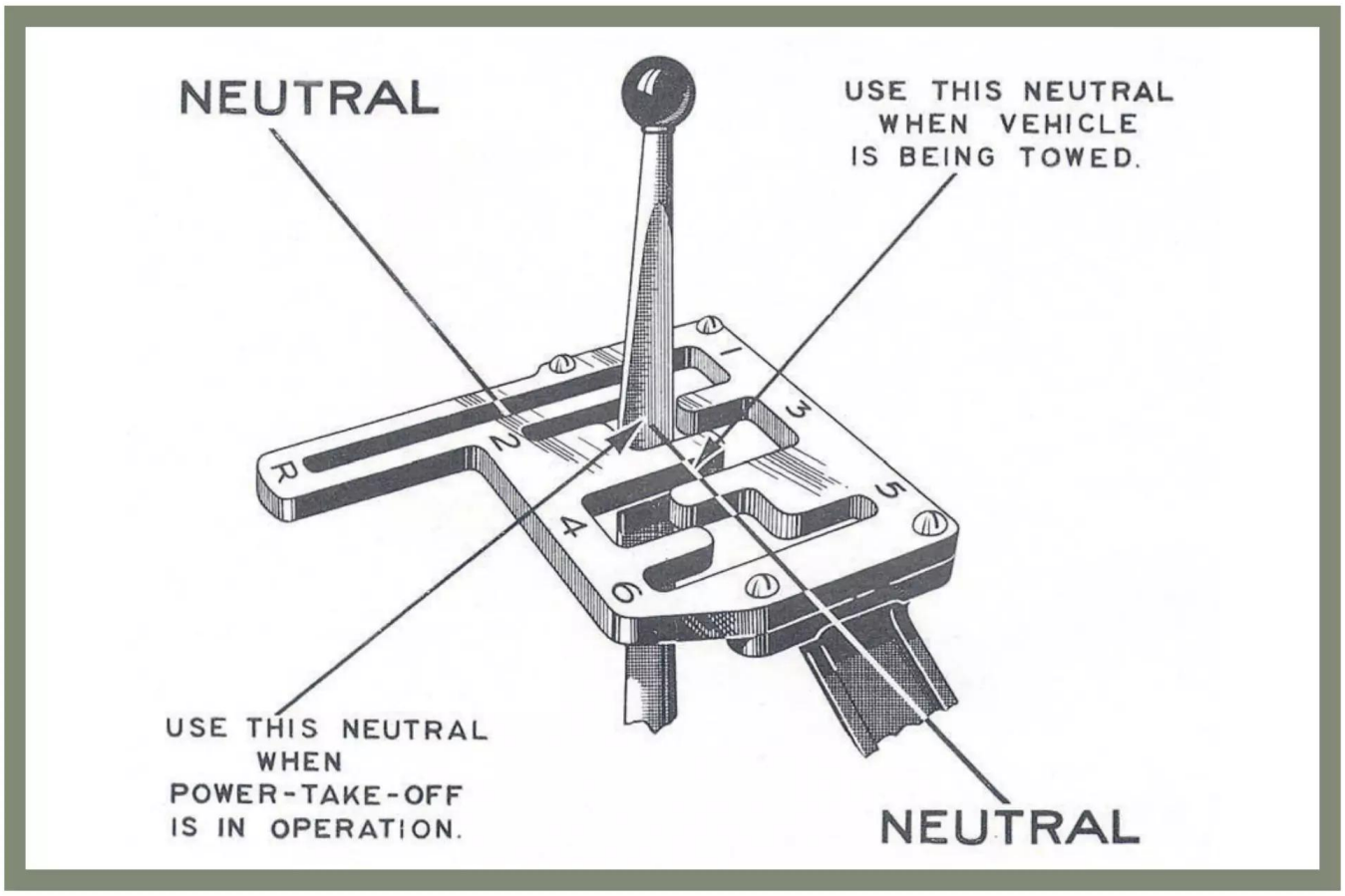
● (ABOVE) Exploded view of the Still tube radiator showing the method of construction. The radiator could be disassembled in the workshop to allow replacement of damaged tubes, etc.



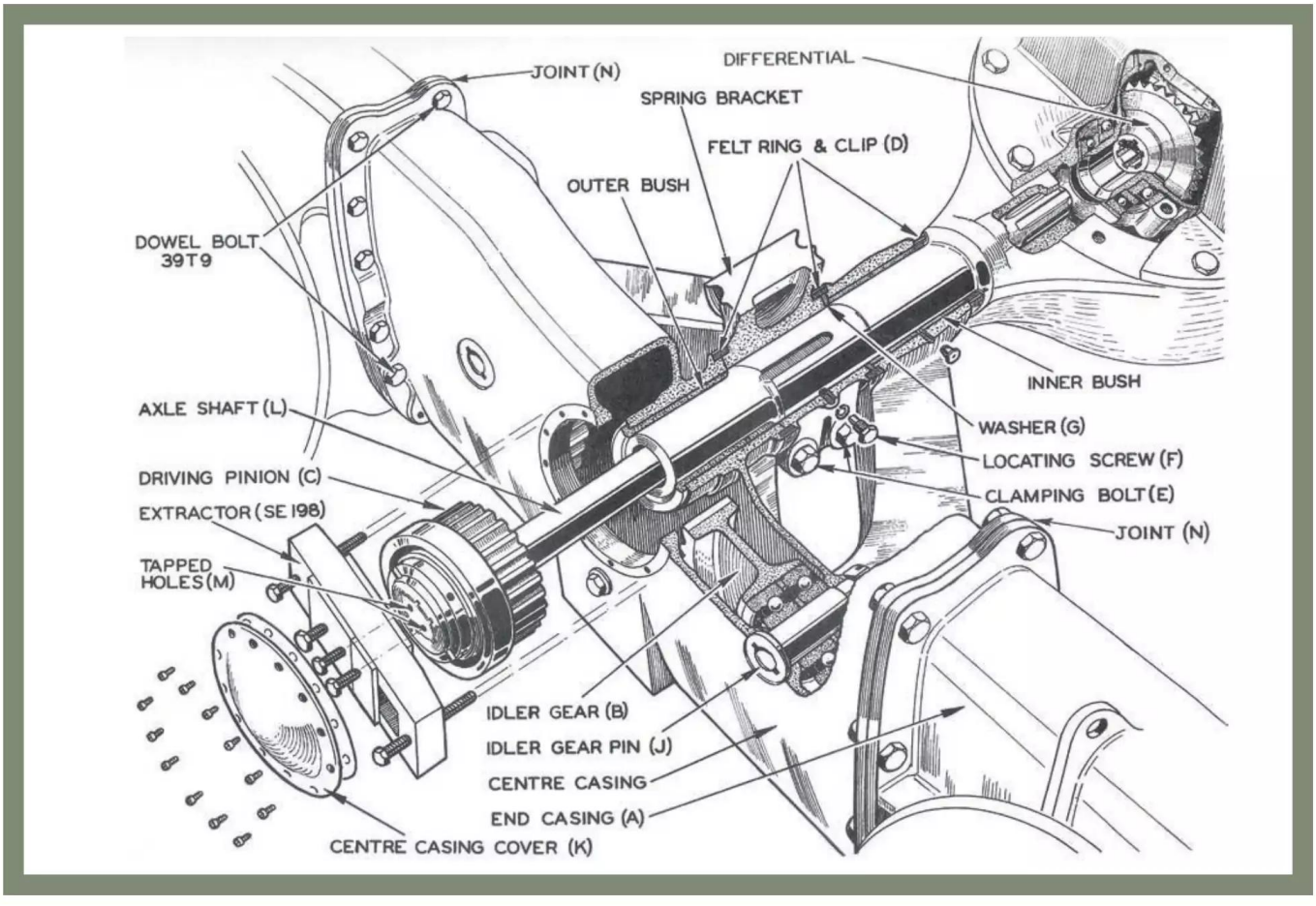
● (LEFT) Cutaway view of the six-speed pressure-lubricated constant-mesh gearbox. The gear ratios were lower than those used on the artillery tractor and the breakdown-recovery vehicle: in first gear, the overall final-drive ratio was 182:1, in top gear, it was 15.86:1.



● View of the front end of the Pioneer, showing the sprung tow hook, radiator blind, blackout light, and the radiator, with its distinctive 'teapot'. Note how the radiator now lacks the 'Scammell' name which, on early production vehicles, was cast into the plinth supporting the 'teapot' itself.

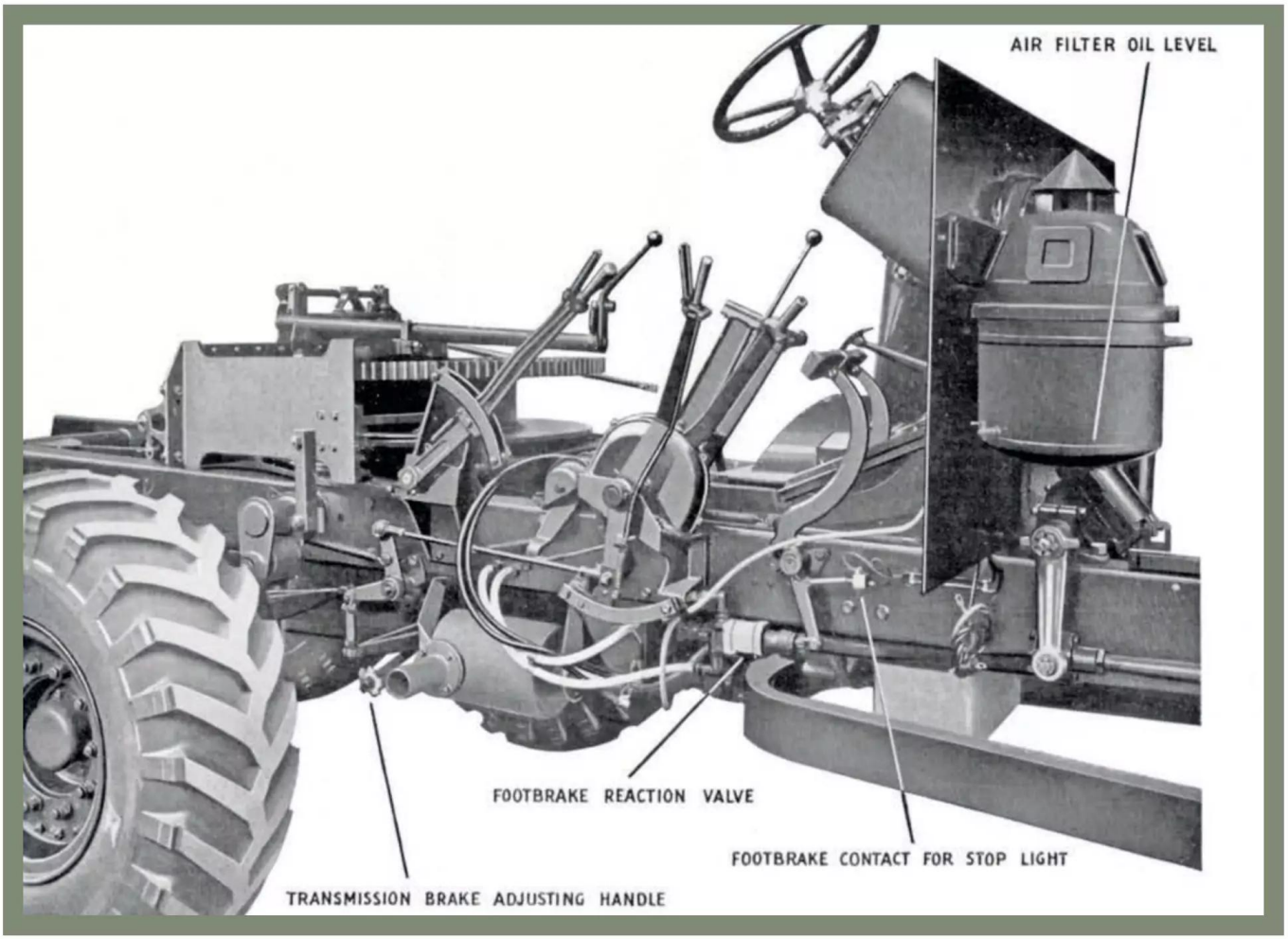


● Open-gate gear-change selector showing the four neutrals: the neutral position between first and reverse was not to be used since the gearbox, which required one gallon (4.54 litres) of WD 50HD oil, would not have been properly lubricated.

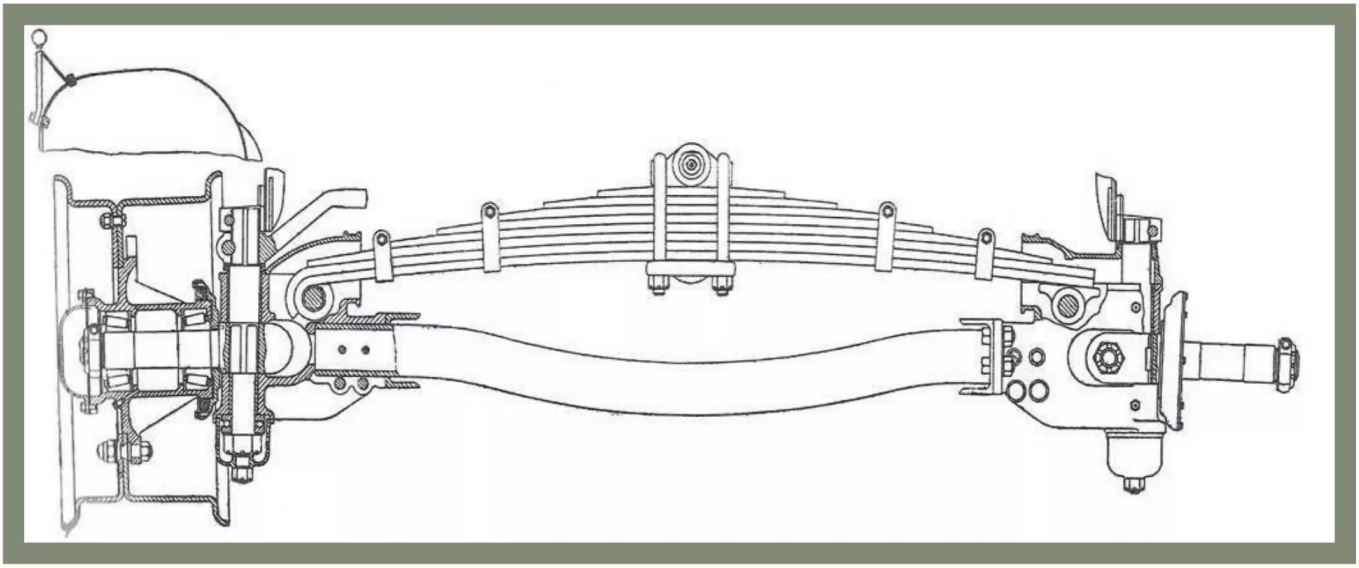


● Cutaway and exploded view of the central pivot of the walking-beam gear case.

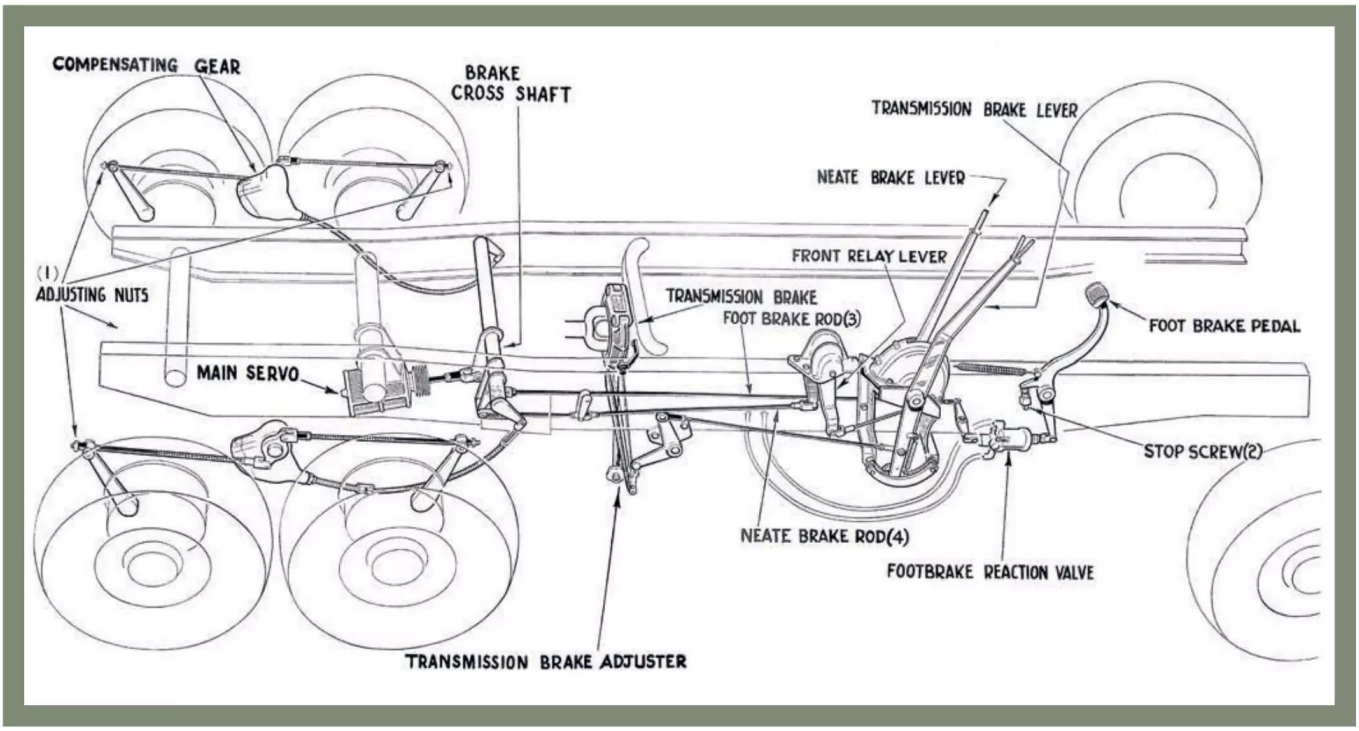
● View under the right-hand rear wheel showing the differential casing, suspension arrangements, and the walking-beam gear case.



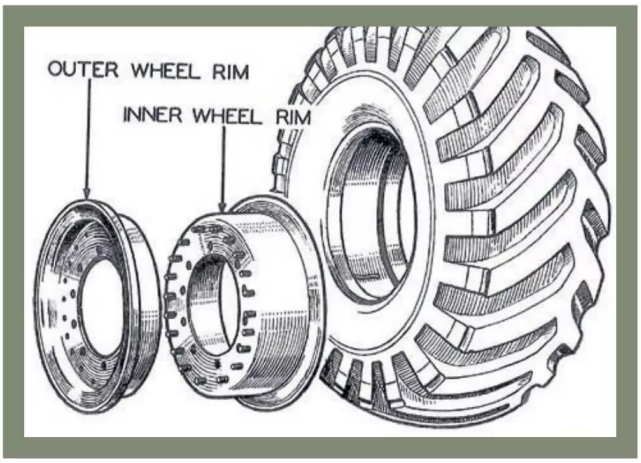
● With the body removed, the levers that control the Neate brake and the transmission brake are easily seen in the centre of the photograph. This view also shows the levers that are used to engage and brake the winch.



● Front axle arrangements, looking from the front end, showing the semi-elliptical spring and the central pivot. The spring was pin-jointed to the offside stub axle swivel jaw and was supported by a slipper pad on the nearside to allow the length of the spring to alter in response to the road surface.

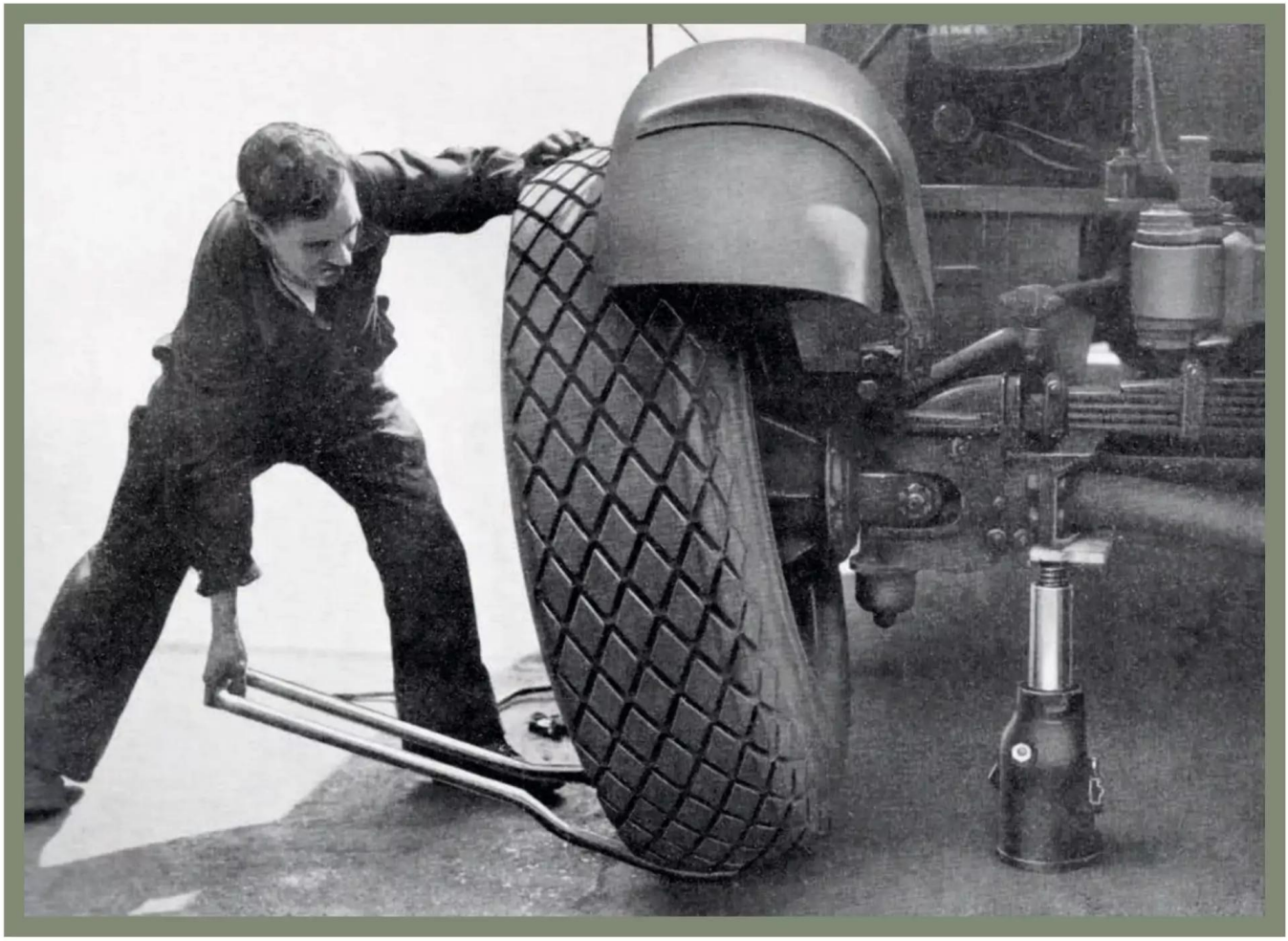


● Although the front wheels lacked brakes, the Pioneer actually had three braking systems. The main brakes were mechanically-operated by pedal, with air-pressure assistance; there was a so-called Neate brake interconnected with the foot-brake pedal to provide additional braking when descending hills, and when parking; and finally, there was a hand-operated transmission brake.

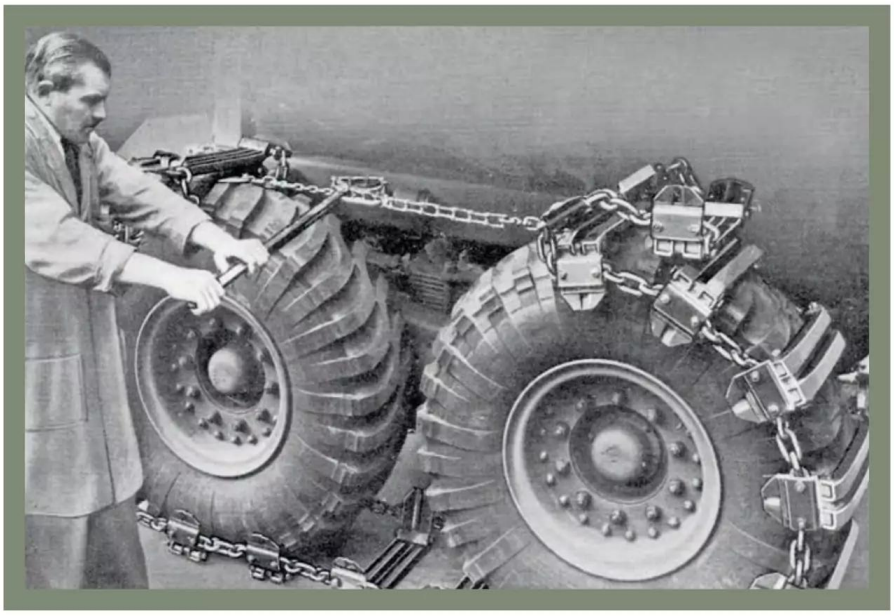


● The wheels were 20in diameter, and consisted of two separate components, bolted together by a ring of 20 bolts, and attached to the hub by 10 studs; on the 30-ton outfit, the tyre sizes were 15x20in on the tractor, and 13.5x20in on the semi-trailer. Although this didn't always seem to be the case, the wheels were supposed to have been mounted so that the open end of the chevron on the tyre faced forwards as it contacted the ground.

wheel, the two components were bolted together through a sliding mechanism which incorporated a Spencer-Moulton rubber shock mount. The mechanism prohibited rotation beyond 90° in either direction. Under the cab floor, and bolted across the main channel members of the chassis, was a Scammell vertical-spindle 8-ton mechanical winch, driven by a power take-off from the gearbox. The winch was arranged to allow winching from the front or rear of the vehicle, and could be used to assist with loading disabled vehicles onto the semi-trailer, or for self-recovery



● Despite their considerable weight, it was possible for one man to remove a wheel and tyre using a double-pronged crowbar.



● Fitting and tensioning the Kennedy & Kemp caterpillar tracks to the rear wheels. Often described as 'chains', the tracks were intended to improve traction on soft ground or in ice and snow.

or manoeuvring on bad ground. The winch speed was 108 feet/minute (33m/minute) at 1750rpm and there was 500 feet (182m), later 600 feet (218m), of 3/4in (20mm) steel cable available, with a breaking load of 22 tons (22.4 tonne).

The semi-trailer

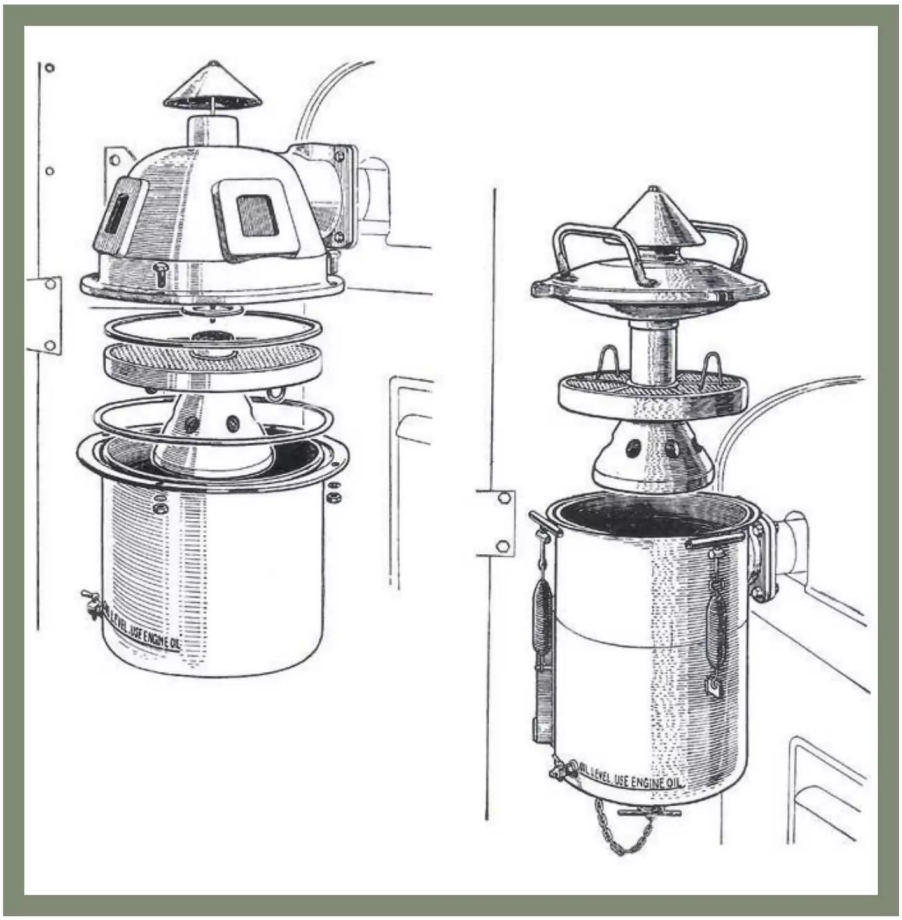
The semi-trailer was carried on eight wheels mounted in pairs on balance beams that were, in turn, attached to a cross-member. The wheels were unsprung, aside from any natural buoyancy provided by the balloon tyres.

Early 20-ton semi-trailers had a welded, sloping deck and a knock-out four-wheeled bogie that had to be removed to allow loading; later examples had a flat deck and removable ramps. The 30-ton trailers had a more-sharply sloped deck with long folding ramps and separate ramp extensions, but this was eventually replaced by a deck that rose at a shallower angle with longer loading ramps that did not require the ramp extensions.

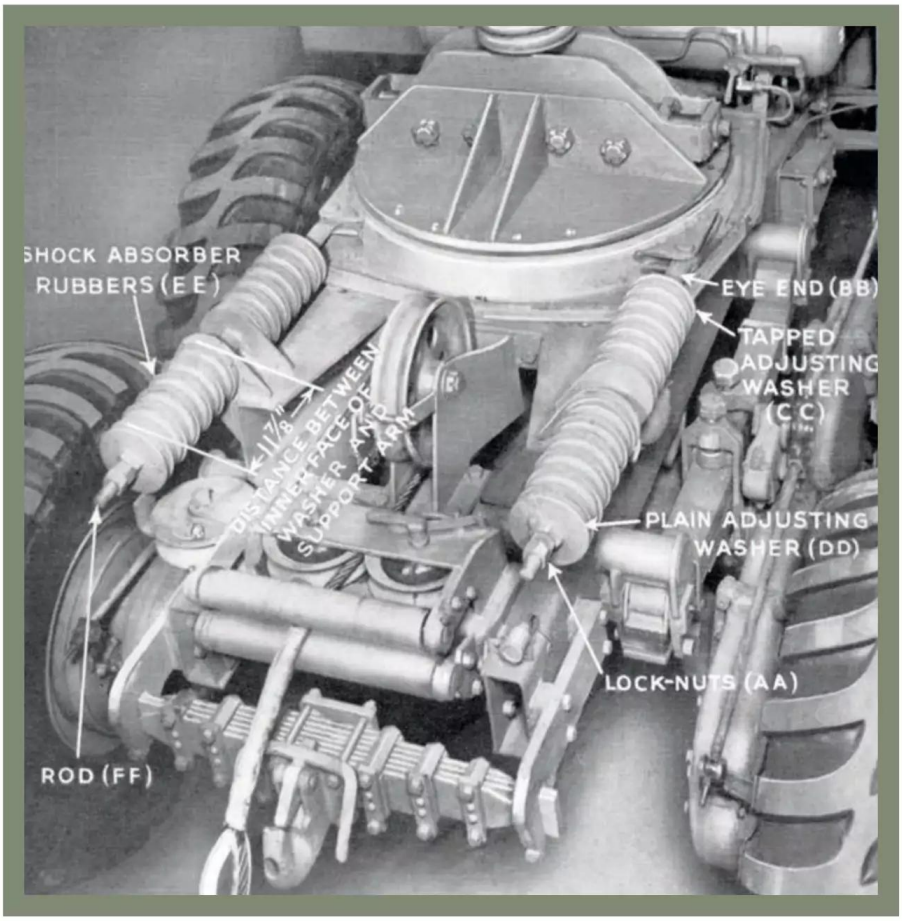
The straight, inclined deck of the original pattern of 30-ton semi-trailer had the effect of raising the centre of gravity somewhat, but also had the advantage of transferring more weight from the trailer to the driving axle. It also meant that a disabled tank could be unloaded by gravity.

Winch cable sheaves were fitted to the swan neck of the trailer.

When the semi-trailer was uncoupled from the tractor, a pair of Miller 'Skyhi' 20-ton hydraulic jacks were placed at

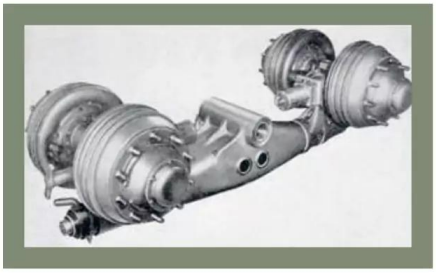


● Two types of air cleaner were used: of cast (on the left), or pressed, construction. The cleaner was tucked into the corner formed by the engine compartment and the cab bulkhead on the offside of the vehicle.

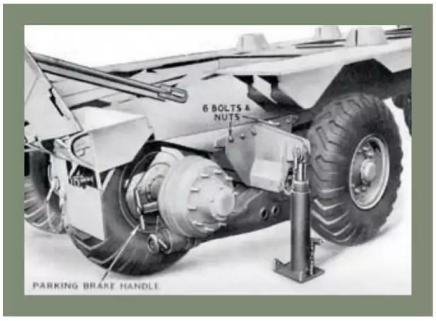

SHOCK ABSORBER RUBBERS (EE)
EYE END (BB)
TAPPED ADJUSTING WASHER (CC)
1 1/8" DISTANCE BETWEEN INNER FACE OF WASHER AND SUPPORT ARM
PLAIN ADJUSTING WASHER (DD)
LOCK-NUTS (AA)
ROD (FF)

● Photograph showing the semi-trailer coupled to the tractor. The semi-trailer is attached to the upper part of the fifth wheel by pins that pass through holes in the projecting arms of the trailer nose and through the upper, rotating component of the fifth wheel.

the forward end of the frame. The same jacks could be attached to a position between the rear wheels to allow the rear end of the semi-trailer to be lifted for changing a wheel, or at the extreme rear to steady the trailer during loading operations. When not in use, the jacks were stowed in brackets on the semi-trailer frame members.

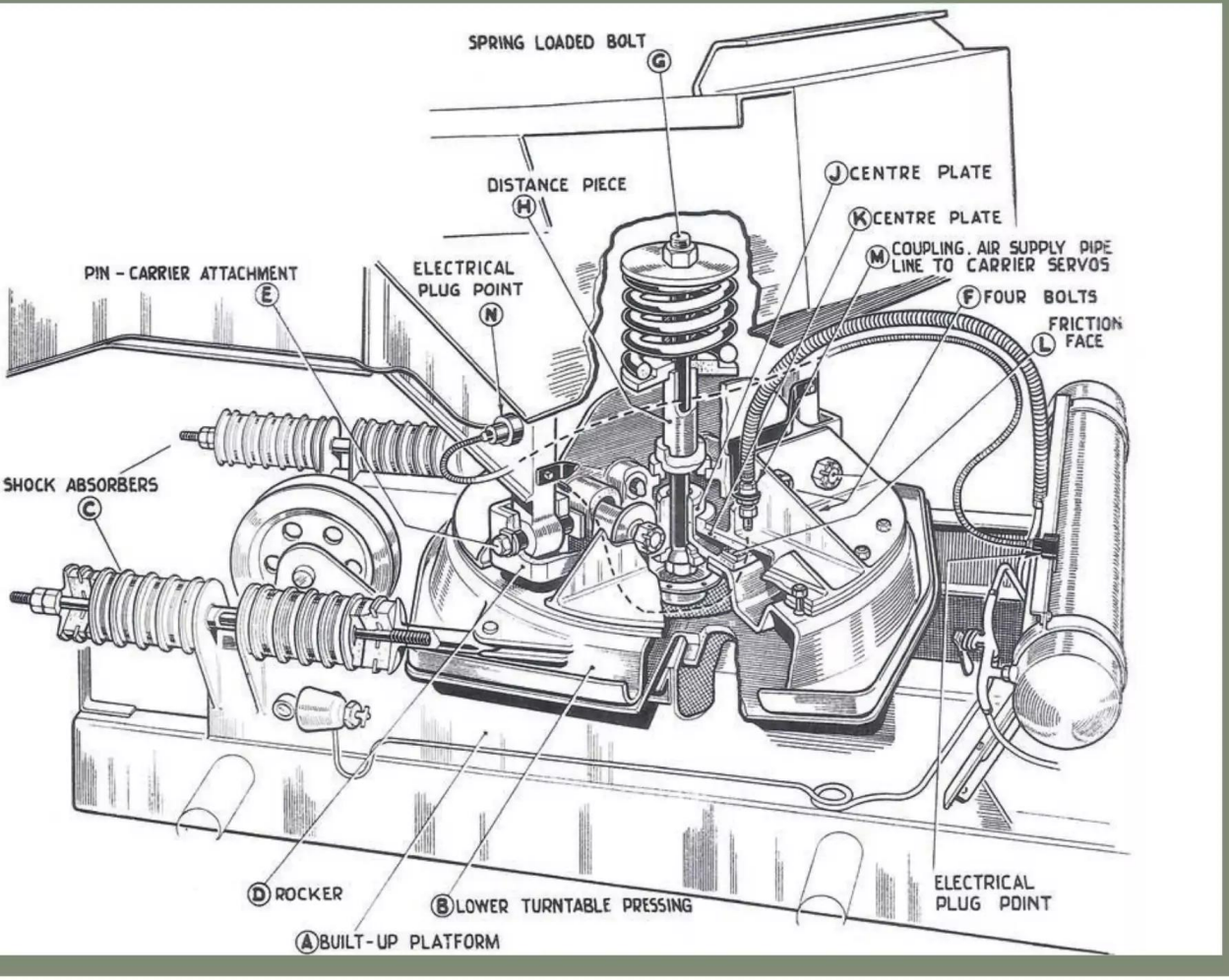


● Walking beam – or balance assembly – arrangement of the semi-trailer. This is an offside unit.

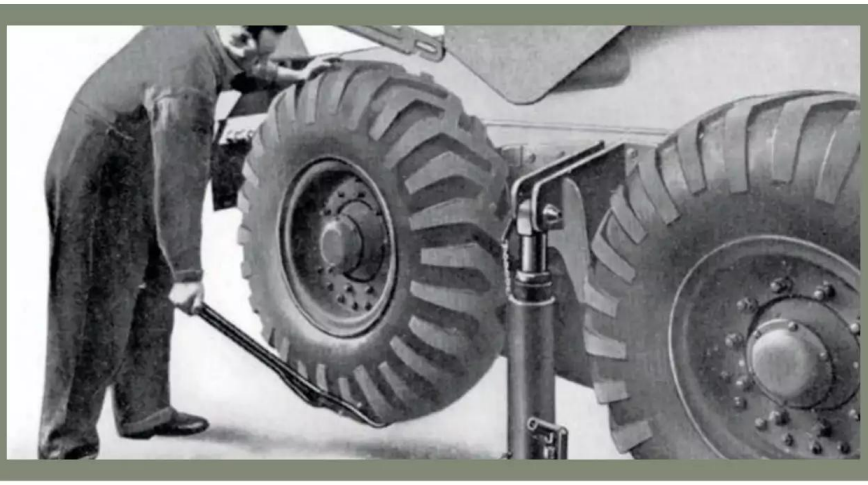


● Operating handle for one of the four parking brakes on the semi-trailer. This also shows the correct position of the jack when removing a semi-trailer wheel.

● View of the two part, friction-faced fifth wheel – or turntable as Scammell preferred it – clearly showing the rubber cylinders designed to absorb some of the shock of moving off from rest when heavily loaded.



● Diagram showing the assembly of the fifth wheel. The tractor can be uncoupled from the semi-trailer, by disconnecting the electrical systems and the braking system airline, and removing the two pins identified as 'pin – carrier attachment': the fifth wheel remains attached to the tractor.



● Using the double-pronged crowbar to remove a semi-trailer wheel.

War Office census numbers

20-ton tank transporter TRMU20/TRCU20

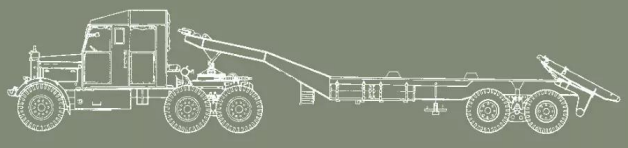
H3810102-H3810106	H393824	H3936817-H3936818	H4575940-H45756046

30-ton tank transporter, TRMU30/TRCU30

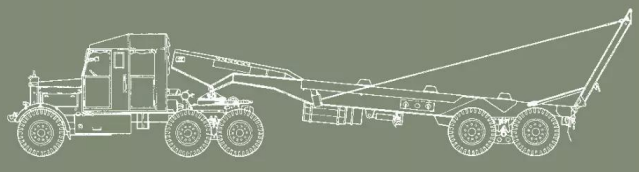
H4326085	H4471868-H4471885	H4500912-H4500928	H4611610-H461127
H4752360-H4752361	H4752360-H4752361	H4752362-H4752391	H4662140
H4778876-H4778909	H5306569-H5306746	H5830272-H5830421	H6239153-H6239162

FACTS & FIGURES - 20- AND 30-TON PIONEER TANK TRANSPORTERS: TRMU20/TRCU20 & TRMU30/TRCU30

	TRMU20/TRCU20		TRMU30/TRCU30	
Engine: Gardner 6LW, diesel				
Cylinders	6	6	6	6
Capacity	8369cc	512in³	8369cc	512in³
Bore and stroke	4.25 x 6in	108.5 x 152mm	4.25 x 6in	108.5 x 152mm
Fuel	diesel oil	diesel oil	diesel oil	diesel oil
Power output at 1700rpm	102bhp	76kW	102bhp	76kW
Maximum torque	358 lbf/ft	485Nm	358 lbf/ft	485Nm
Dimensions and weight				
Overall length (ramps raised)	599in	15,021mm	597in	15,164mm
Overall width				
tractor	103in	2616mm	103in	2616mm
semi-trailer	110in	2794mm	113.5in	2883mm
Height				
top of cab	113in	2870mm	113in	2870mm
top of raised ramps	112in	2845mm	131in	3327mm
Wheelbase				
tractor	180in	4572mm	180in	4572mm
with semi-trailer	270in	6858mm	267in	6782mm
Bogie centres	54.5in	1378mm	54.5in	1378mm
Ground clearance				
front axle	12.5in	317mm	12.5in	317mm
semi-trailer axle	8in	205mm	8in	205mm
Turning circle				
left	72ft	21.88m	79ft	24.09m
right	73ft	22.27m	81ft	24.7m
Weight				
unladen, tractor only	10.43 ton	10.63 tonne	11.60 ton	11.81 tonne
unladen, with semi-trailer	15.5 ton	15.78 tonne	19.89 ton	20.26 tonne
maximum permissible laden weight				
front axle	3.25 ton	3.31 tonne	3.85 ton	39.20 tonne
rear axle	14.09 ton	14.34 tonne	15.5 ton	15.78 tonne
semi-trailer bogie	18.05 ton	18.38 tonne	30.45 ton	31 tonne
maximum gross train weight	35.39 ton	36.03 tonne	49.8 ton	50.70 tonne
Performance				
Fuel consumption	4mpg	1.7km/litre	3.6mpg	1.53km/litre
Maximum speed				
first gear	1.35mph	2.17km/h	1.35mph	2.17km/h
top gear	15mph	25km/h	15mph	25km/h
Maximum grade	1 in 3.5	28%	1 in 4.5	22%



● Side elevation - 20-ton tank transporter (TRMU20/TRCU20) with folding loading ramps



● Side elevation - 30-ton tank transporter (TRMU30/TRCU30) with second, later, pattern of semi-trailer

THROUGH MUD & SAND

From France to North Africa and Normandy... the Pioneer in service

Despite generally being referred to simply as 'tank transporters', heavy tractors designed for carrying tanks actually have a dual purpose. Firstly, in the transporting role, under the remit of the Royal Army Service Corps (RASC), a transporter can increase the range and mobility of a tank by, for example, delivering it from the place where it was manufactured to a vehicle depot or park, or to a battle area. This helps to prolong the life of the tracks, which can easily be ruined by long 'marches' across muddy or desert terrain... thus crippling an armoured force even before the enemy has been engaged. Remember, many of the British tanks of the period were already notoriously unreliable. At the same time, tanks use huge amounts of fuel, thus presenting a potential logistical problem. Secondly, under the aegis of the Royal Electrical and Mechanical Engineers (REME), a transporter can act as a recovery vehicle for 'dead' or damaged tanks, using the on-board winch. The tank would then be carried to the rear to be handed over to workshops for repair. Once operational again, the tanks would be recycled back into action, often using RASC transporters.

● 30-ton Pioneer photographed in the Western Desert. The semi-trailer is the later version, in which the trailer bed is closer to the horizontal. The tank is an American M3 Grant medium, which, with an overall height, when loaded on the trailer, of more than 15 feet (4500mm) presents a mighty tall target... though not as tall as the M3 Lee variant, which would have nudged 16 feet (4880mm)!

With a crew of three men, a recovery operation might involve an initial journey of 5-20 miles (8-32km) to reach the tank, and then anything up to 100 miles (160km) to get the tank back to the workshop. Close liaison was required between the third-line REME workshops and the RASC transporter companies and tank-delivery units since there was little point in repairing a tank up to a life expectancy of 500 miles (800km)... and then driving it 400 miles (650km) on its tracks to the forward area.

Lastly, aside from carrying tanks and other large tracked vehicles, other, more unusual loads for tank transporters included aircraft, with the wings removed, and railway locomotives. The semi-trailer was also sometimes adapted to carry bulk supplies of water, fuel, oil and ammunition.

Tank-transporter companies

In the RASC, transporters were organised into companies, each of which was equipped to move an armoured regiment. A company consisted of three transport platoons and a workshop platoon, each consisting of 30 vehicles. Three companies were usually combined to make a column capable of transporting an armoured brigade.

During WW2, tank transporter columns were controlled by the General Staff, with the RASC commander in absolute control of the convoy. He drew up the so-called 'march tables', and decided the speed and density of the vehicles, and was also responsible for determining when there would be meal and maintenance breaks. The platoons were effectively self-contained, and could live on their own resources for several days at a time.

Although, of necessity, tank recovery sometimes took place under fire, RASC units did not generally engage the enemy, and if a convoy was attacked, the senior officer of the tank unit that was being carried assumed control.

Note that by the first half of 1942, most British tank transporter companies had been equipped with Diamond T tractors and Rogers or Cranes trailers and the Pioneers were relegated to lesser duties. Pioneer tank transporters also served with the armies of New Zealand, South Africa, and Czechoslovakia during WW2.

Pioneers in Northern France...

Two 20-ton Pioneer tractor and semi-trailers are known to have been in British service at the beginning of 1939. By early 1940, nine were available to cross with the 1st Armoured Division as part of the British Expeditionary Force (BEF).

Most of the BEF's vehicles and equipment remained in France when the Expeditionary Force was rescued from the beach at Dunkirk in 1940, a total of 63,879 vehicles in all... leaving an estimated 50 tanks in Britain, together with a handful of transporters. The vehicles that were being abandoned were supposed to have been burned, smashed, or otherwise destroyed to prevent them being useful to the enemy, but this was not always done effectively, and many were subsequently pressed into service with the occupying Germans.

...and in the desert

Both the 20- and 30-ton Pioneer tractors put up a good performance with the 8th Army in the Western Desert from 1940, where the truck was said to 'have been successfully used for recovery work... where its moderate cross-country performance shows up to advantage'.

The 30-ton tractor could carry most British and US tanks, up to a weight of 30 tons, which included the Matildas, Cruisers and Crusaders with which the 8th Army was mostly equipped, but, sadly, was a lot less useful when faced with the weight of a Churchill, a Comet or even a Sherman tank... the latter, at 29.75-37.5 tons (30.3-38.1 tonne), being described as 'rather too heavy for the 8th Army's existing equipment'. Nevertheless, photographs exist which show Shermans on 30-ton Pioneer semi-trailers.

● 'Somewhere in England'... 30-ton Pioneer, again with the late model semi-trailer, this time loaded with an A12 Matilda infantry tank. Although difficult to manufacture due to the one-piece armoured side skirts, the Matilda was deployed in Northern France in 1940 as well as in the Western Desert. It was considered obsolete by mid-1942.

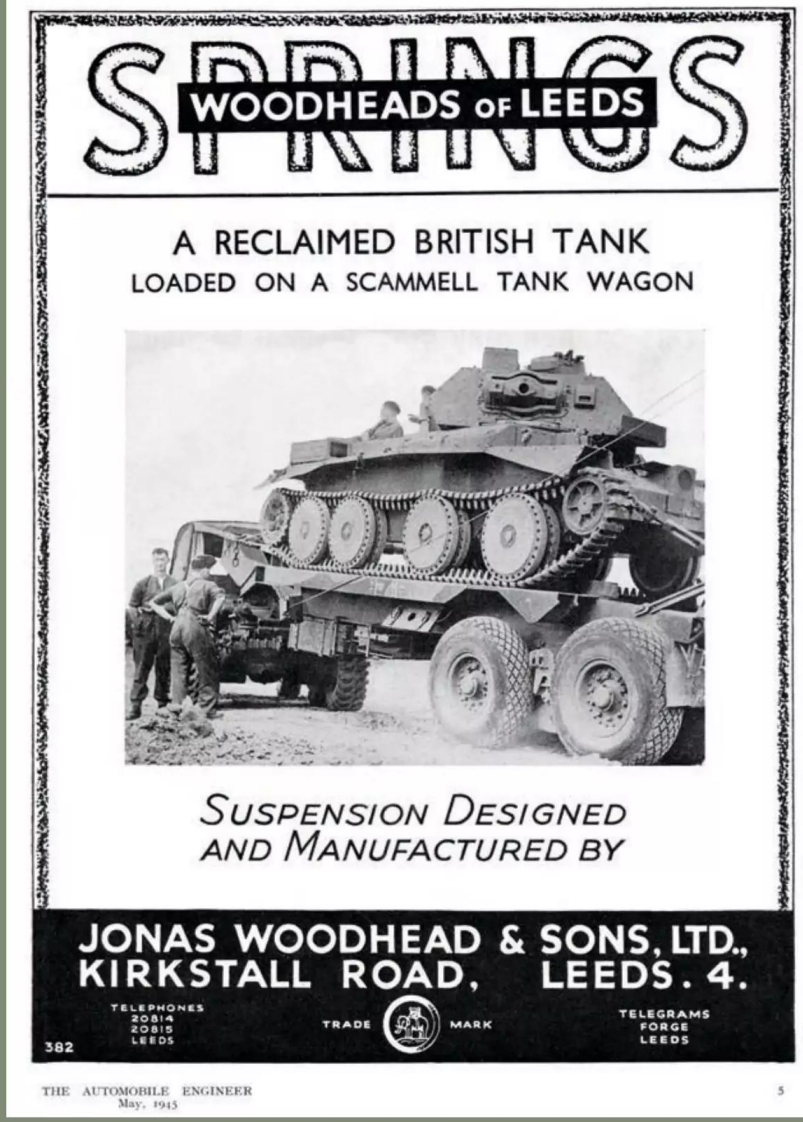
● Early 20-ton Pioneer with the riveted semi-trailer. Like the original 1932 semi-trailer, it was necessary to remove the rear bogie of the semi-trailer to effect loading. Only eight semi-trailers were constructed with this configuration.

● With the semi-trailer ramps lowered, this 30-ton Pioneer waits while an A15 Crusader cruiser tank climbs on board. Note the guide shoes, or buttresses, on the ramps to help keep the tank running straight, but note also that the crew has not deployed the stabilising jacks.

But it wasn't just recovery work, and, at one stage of the 8th Army's advance, a transporter unit lifted an armoured division more than 1,200 miles (1800km) in eight days, getting the tanks into position before an enemy counter-attack. Another transporter unit carried British tanks forward from Tobruk across a distance of 250 miles (405km) of virgin desert, and then returned to bring reinforcement tanks from Mischiefa or Mersa Matruh, the latter a distance of 400 miles (650km) each way. When the battle was over, the tank transporter companies received special mention in an order issued by Field-Marshal Alexander.

It wasn't all easy going, however, and during the ensuing battle, one Scammell driver was lucky to survive a direct hit from an enemy 88mm round which came through the radiator of his tractor and pushed the engine back between the front seats. At the end of the retreat from Libya to El Alamein in the summer of 1942, transporters recovered hundreds of disabled tanks from under the enemy's nose and returned them to workshops to be rebuilt and repaired to fight another day. More unpleasantly, recovery crews occasionally came across tanks that had been destroyed by enemy action and which still contained human remains.

There was always a shortage of transporters, and, during 1942, the 8th Army was forced to convert one tank-transporter company to another role simply because there were not sufficient tank transporters available. Indeed, at the final REME conference before the battle of El Alamein there was said to be a shortage of almost 100 tractors and recovery trailers. However, despite the appearance of the Diamond T from mid-1942 onwards, with Numbers 543 and 228 Tank Transporter Companies being the first to be so equipped, Scammells were still in use during Operation Torch in French North Africa late in the year, with many remaining in service in North Africa until well into 1943.



● In May 1945, Woodheads of Leeds ran this advertisement in the '*Automobile Engineer*' magazine boasting of their involvement in the design and manufacture of the compression-spring suspension system of the Crusader Mk IVA cruiser tank, which, by this stage of the war was relegated to training duties.

Pioneers in Normandy

Surprisingly, the first tank transporters to go ashore on D-Day, from 2 Tank Transporter Column RASC, were 15-ton Albion CX24S tractors carrying Royal Engineers' road-construction equipment, and the heavier types of transporter did not appear on the beach head until some weeks later. This was not a problem in the weeks immediately following the landings, since the tanks were not required to travel long distances in order to engage the enemy.

Nevertheless, Pioneer tank transporters were photographed in vehicle parks during the build-up for D-Day, and despite restrictions on utility brought about by virtue of their 30-ton rating, Pioneers were still being used by Royal Army Service Corps (RASC) units

● This photograph shows the modifications that were made to the swan neck of the 30-ton semi-trailer in 1940 to reduce the loading height. The angle of the deck was reduced to 8° from the horizontal, but this meant that the tank sat slightly further back on the trailer.

● A27M Cromwell cruiser tank loaded onto the original pattern of 30-ton semi-trailer. The Meteor engined Cromwell was in production from January 1943 to 1945, and remained in service until 1955. A total of more than 4000 examples were constructed.

to move tanks forward. However, there were problems with the narrowness of roads in France and many tanks ended up travelling on their tracks, resulting in high rates of track wear.

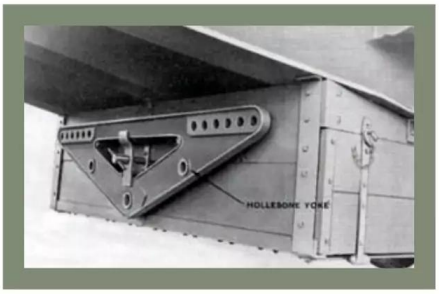
Typical loads

Wartime general notes produced by the War Office on tank-transporter and recovery vehicles stated that tanks up to 20 tons in weight, for example Covenanter, Crusader, and Valentine, and Dragon artillery tractors, could be carried by the 20-ton Scammell Pioneer and the soon to be downgraded 20-ton Albion CX24S.

For tanks up to 30 tons in weight the notes stated that 'the 30-ton Scammell has been in production for some time and has proved a very satisfactory vehicle'. Typical loads would have included, for example, Cavalier, Centaur, Covenanter, Cromwell, Crusader, Matilda, and Valentine tanks, Canadian Ram, and US Army M3/M5 Stuart light tanks, and M3 Lee/Grant medium tanks; the M4 Sherman medium tank was also listed although it was, in theory, heavier than 30 tons.

In what were described as 'very special circumstances', which included increasing the tyre pressures on the tractor and trailer, and very precise positioning of the tank to maintain the

● Charmingly nicknamed 'Molly', this 30-ton Pioneer, with a late trailer, was photographed in North Africa. The load is an A15 Crusader cruiser tank. Note how the windscreen on the tractor has either been opened wide or removed to aid ventilation.

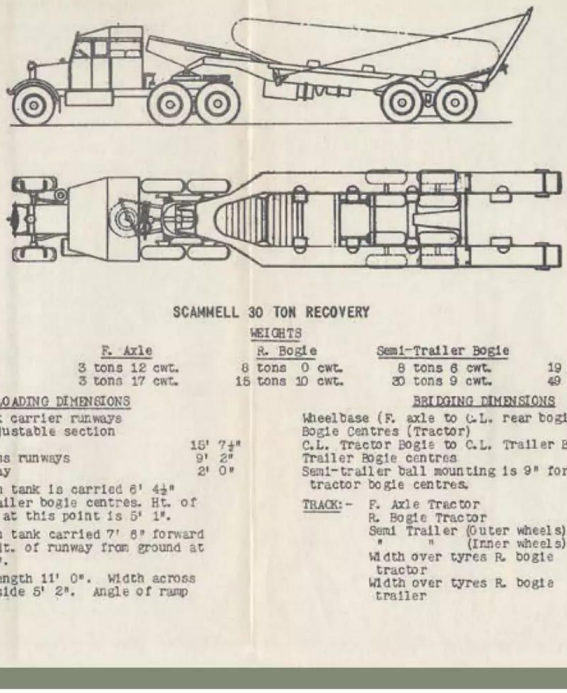


● The Hollebone yoke in its stowed position under the semi-trailer.

Table of heights when laden with the following tanks

Sherman	14′ 5″	Matilda	13′ 4″
Churchill	14′ 2″	Valentine	13′ 3″
Crusader, Covenanter	12′ 8″	Cromwell, Centaur, Cavalier	13′ 0″
Stuart	12′ 6″		

● Simple table taken from the 'Manual of Recovery', giving the height of the 30-ton Pioneer when loaded with a range of tanks such as would have been in service during the later years of the war.



SCAMMELL 30 TON RECOVERY

WEIGHTS

	F. Axle	R. Bogie	Semi-Trailer Bogie	Gross
Unladen	3 tons 12 cwt.	8 tons 0 cwt.	8 tons 6 cwt.	19 tons 18 cwt.
Laden (Matilda)	3 tons 17 cwt.	15 tons 10 cwt.	30 tons 9 cwt.	49 tons 16 cwt.

LOADING DIMENSIONS

Length of main tank carrier runways (from front to adjustable section over rear wheels) 15′ 7½″
Overall width across runways 9′ 2″
Width of each runway 2′ 0″

C.G. of 30 ton tank is carried 6′ 4½″ forward of semi-trailer bogie centres. Ht. of runway from ground at this point is 5′ 1″.

C.G. of 20 ton tank carried 7′ 6″ forward of bogie centres. Ht. of runway from ground at this point is 5′ 3″.

LOADING RAMPS:- Length 11′ 0″. Width across 9′ 2″. Width inside 5′ 2″. Angle of ramp 18 degrees.

BRIDGING DIMENSIONS

Wheelbase (F. axle to C.L. rear bogie) 15′ 0″
Bogie Centres (Tractor) 4′ 6½″
C.L. Tractor Bogie to C.L. Trailer Bogie 22′ 4″
Trailer Bogie centres 5′ 1″
Semi-trailer ball mounting is 9″ forward of tractor bogie centres.

TRACK:- F. Axle Tractor 6′ 10″
R. Bogie Tractor 6′ 7½″
Semi Trailer (Outer wheels) 8′ 3″
" " (Inner wheels) 3′ 9″
Width over tyres R. bogie tractor 7′ 10½″
Width over tyres R. bogie trailer 9′ 5½″

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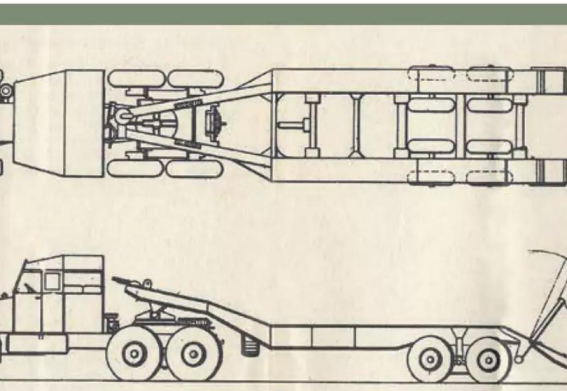
● Basic dimensions, weights and other details for the 20- and 30-ton Pioneer tank-recovery vehicles, in both cases, with the second pattern of semi-trailer. These pages are reproduced from the War Office '*Data Book of Wheeled Vehicles*'.



SCAMMELL 20 TON RECOVERY

Note: Front tyres are 10.50 - 20, same size as semi-trailer tyres.

WEIGHTS

	F. AXLE	R. BOGIE	SEMI-TRAILER BOGIE	GROSS
Unladen	3 tons 0 cwt.	7 tons 8½ cwt.	5 tons 1 cwt.	15 tons 10 cwt.
Laden	3 tons 5 cwt.	14 tons 1½ cwt.	18 tons 1 cwt.	35 tons 8 cwt.

LOADING DIMENSIONS

Length of main tank carrier runway 17′ 7½″
Overall width across runways 8′ 8″
" " inside " 5′ 0″
Width of each runway 1′ 10″
C.G. of 20 ton tank is carried 7′ 10″ forward of semi-trailer bogie centres.
Height of runway from ground (laden) 4′ 2 5/8″

LOADING RAMPS:- Length 6′ 8″. Overall width across ramps 8′ 8″. Width of each ramp 1′ 10″. Ramp angle 25 degrees.

BRIDGING DIMENSIONS

Wheelbase (F. axle to C.L. rear bogie) 15′ 0″
Bogie centres (Tractor) 4′ 6½″
C.L. tractor bogie to C.L. Trailer Bogie 22′ 6″
Trailer bogie centres 4′ 8″
Semi-Trailer mounting is 9″ forward of tractor bogie centres.

TRACK:- F. Axle Tractor 6′ 9½″
R. Bogie " 6′ 7½″
Semi Trailer (Outer wheels) 8′ 1½″
" " (Inner ") 3′ 1½″
Width over tyres R. bogie tractor 7′ 10½″
" " " " " trailer 9′ 2″

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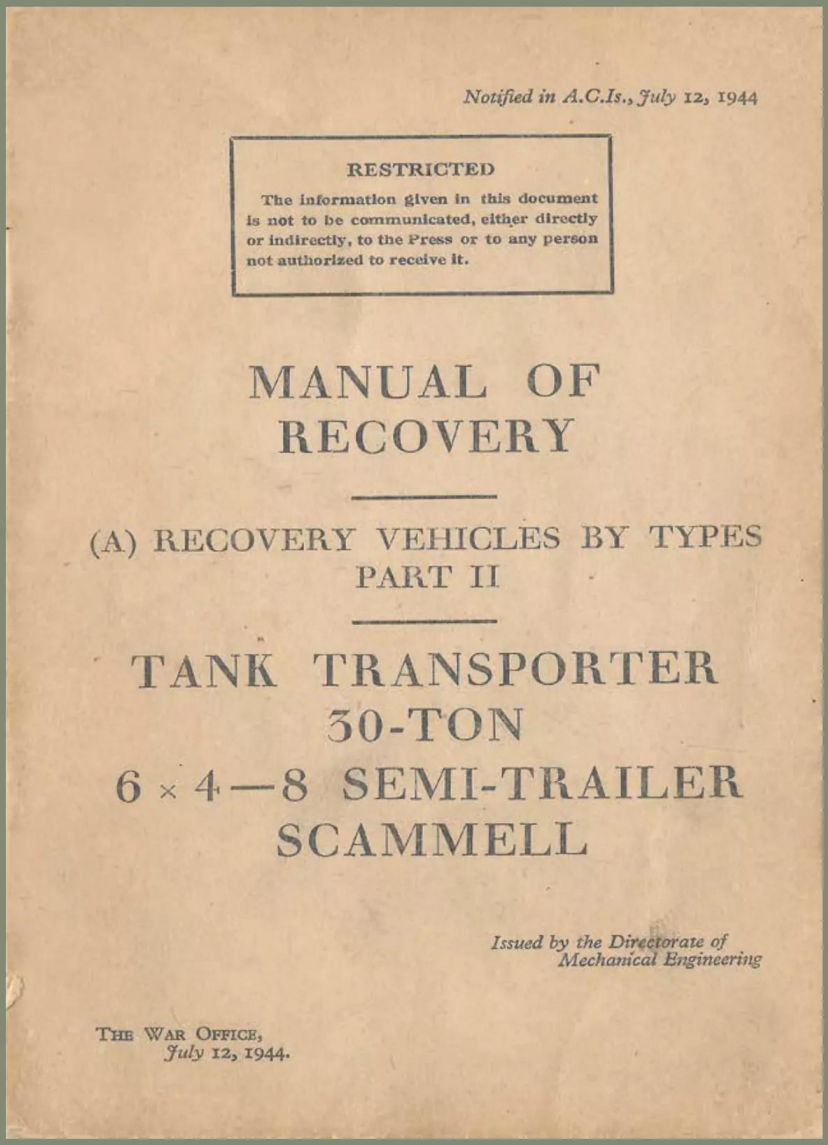
● ABOVE Disabled M4 Sherman medium tank being returned to a workshop for repair on a 30-ton Pioneer, with the late semi-trailer. Disabled tanks were loaded using the Pioneer's on-board winch.

● LEFT During the build-up to D-Day, dozens of vehicle parks were established across southern England where vehicles that would be required during the invasion were stored. This, admittedly rather poor, photograph shows that Scammell Pioneers were certainly amongst the vehicles that were accommodated in these parks.



Notified in A.C.Is., July 12, 1944

RESTRICTED

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MANUAL OF RECOVERY

(A) RECOVERY VEHICLES BY TYPES
PART II

TANK TRANSPORTER
30-TON
6 × 4—8 SEMI-TRAILER
SCAMMELL

Issued by the Directorate of Mechanical Engineering

THE WAR OFFICE,
July 12, 1944.

● '*Manual of Recovery*', dated July 1944, and issued by the Directorate of Mechanical Engineering of the Royal Electrical & Mechanical Engineers (REME). This 36-page booklet sets out basic dimensions for the Pioneer tank transporter, and gives instructions for using the outfit as a tank recovery vehicle.

centre of gravity, the Churchill tank, which exceeded 30 tons (30.55 tonne) in weight could also be carried.

Loading procedure

The War Office 'Manual of recovery', dated 12 July 1944, gives basic dimensional data for the complete outfit, and detailed instructions on how to safely load a tank onto the 30-ton semi-trailer, either by means of the winch, or under its own power.

The loading must take place on level ground, and the tractor and semi-trailer must be perfectly aligned, with all of the vehicle's brakes applied. The two 'Skyhi' hydraulic jacks must be fitted in the appropriate position to brace the trailer before the ramps are lowered, by inserting the ramp stanchions into the appropriate position, running the ramp cables over the stanchions, and then using the hand winch provided for this purpose. The stanchions are removed once the ramps have been lowered.

Eight detachable buttresses are placed in the appropriate position into holes on the trailer bed to match the track width of the tank being loaded.

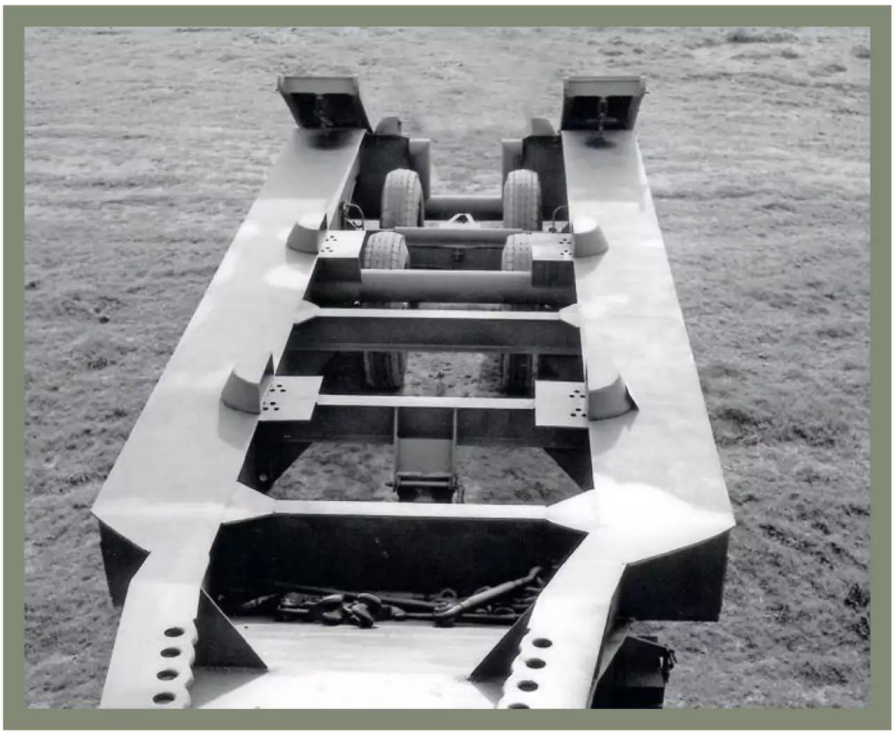
If the tank can travel under its own power, then it is simply driven gently up the ramps, under guidance from a crew member positioned on the trailer swan neck, until its centre of gravity is slightly forward of the 25- or 30-ton mark on the trailer, depending on its weight. The instructions emphasise that no attempt should be made to manoeuvre the tank whilst it is on the ramps or trailer: if corrections are required to the trajectory

● The 20-ton semi-trailer photographed from the rear, showing the hinged loading ramps. Note the '15mph' warning painted onto the right-hand ramp... this was as fast as the Pioneer was able to travel!

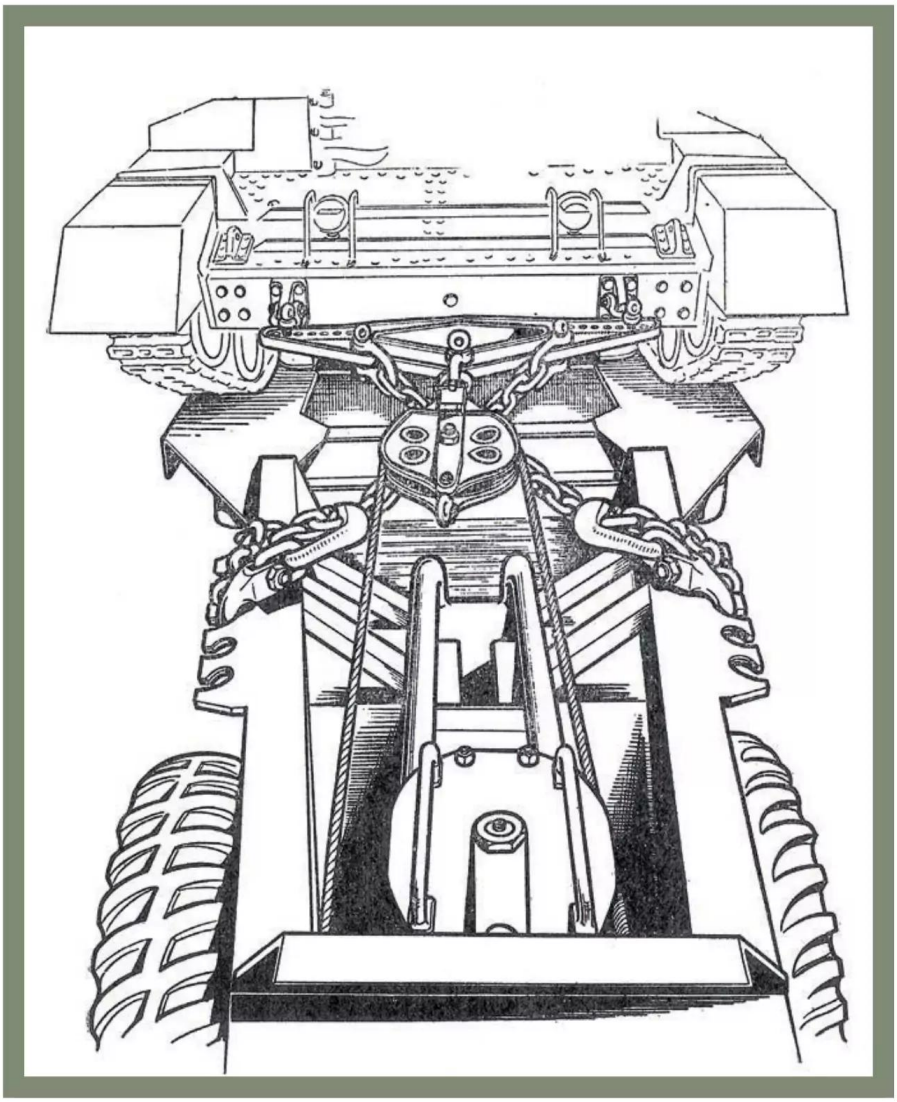
of the tank, it should reverse down the ramps and be realigned before trying again.

If the tank is disabled, the Hollebone yoke is attached to the hull front shackles, and a snatch block attached to the yoke. The tank should then be winched slowly onto the trailer until it is in the correct position according to the centre of gravity markings. If the tank had one damaged track, the other was often removed by the recovery crew to allow the winch to exert a straight pull.

Once loaded, the tank was lashed to the trailer, front and rear, using chains, and the turnbuckles tightened until the chains are secure. The tension in the rear strainers should be checked at intervals once the vehicle is travelling. The stanchions should be refitted and the ramps returned to the travelling position using the hand winches on either side of the semi-trailer. The stanchions can then be removed and stowed away.



● View down the near-horizontal deck of the second pattern of 20-ton semi-trailer, with the ramps in the travelling position.



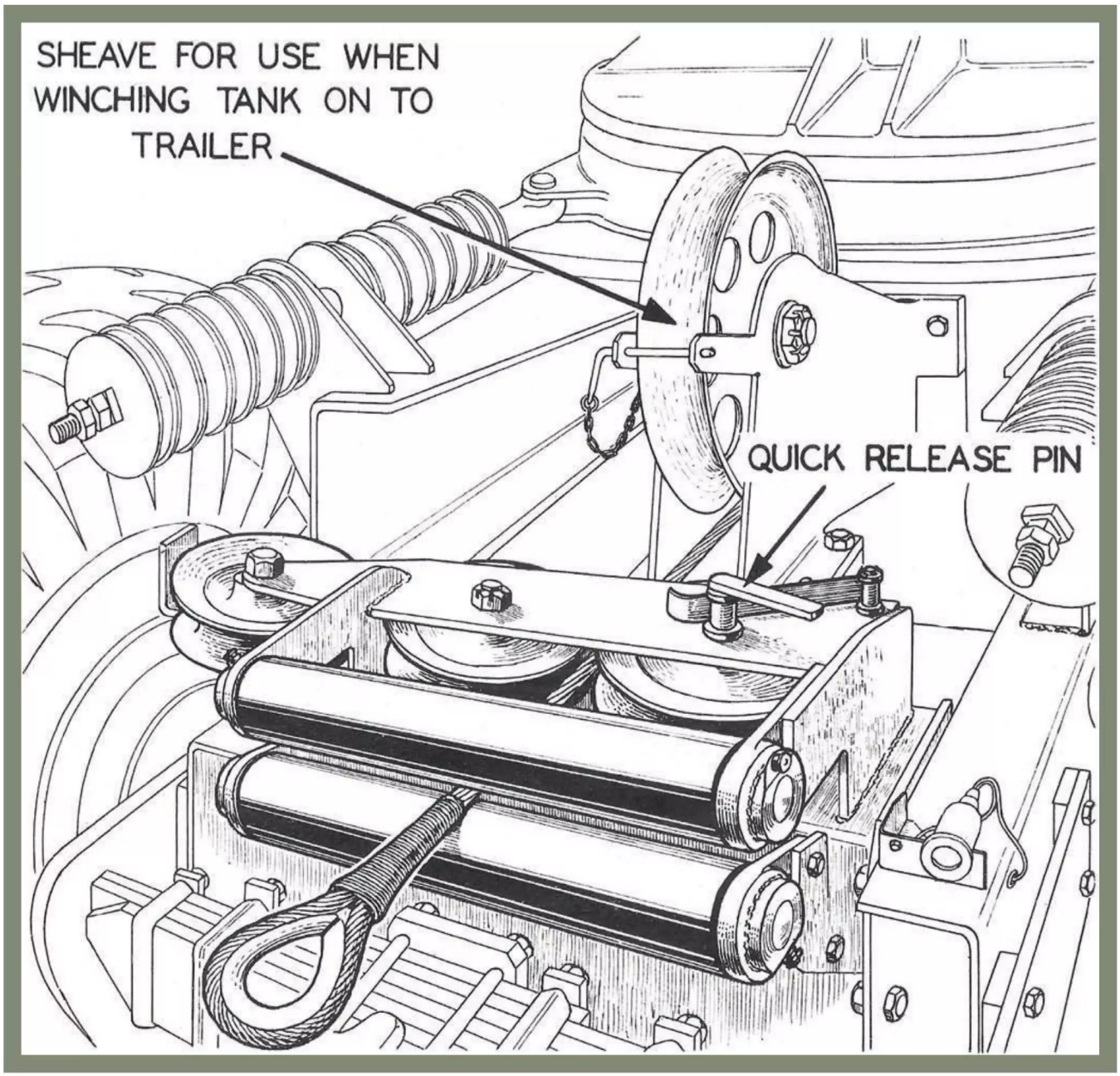
● The tank is secured to the front strainers of the semi-trailer by attaching chains diagonally to the Hollebone yoke. Once the chains are connected, the winch brake can be released, allowing the tank to roll backwards sufficiently to tighten the chains.

Post-war disposal

Deliveries of the Diamond T started in mid-1942 and, as the war ground on, the Pioneer became less and less useful. Some of the 20-ton tractors were converted to 30 tons by virtue of being fitted with uprated trailers, but the vehicle was largely relegated to domestic duties.

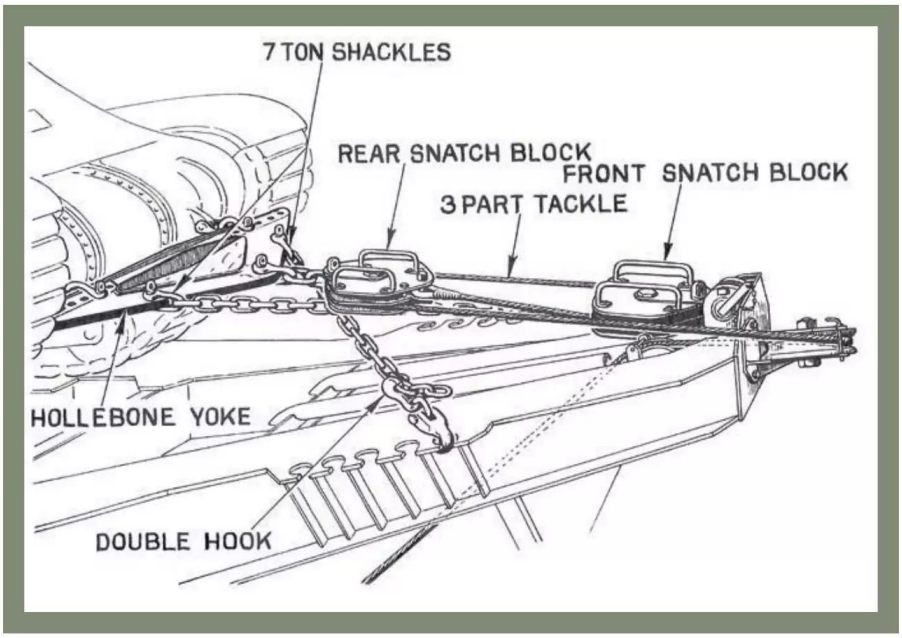
Once the war was over, surplus Pioneer tank transporters were quickly disposed of, either by selling them at surplus-vehicle auctions, or by gifting them to other nations; for example, two went to Denmark immediately after WW2... but since the Danish Army had no tanks until 1952, the Pioneers saw little use! A small number were converted to ballast tractors for use with low-loading engineers' trailers, but were eventually superseded by the Scammell Constructor.

With perhaps a handful of exceptions, the Pioneer tank transporter's military career was finished by about 1950. Interestingly, there is a Pioneer tank transporter, now in private hands, that is marked as belonging to the Royal

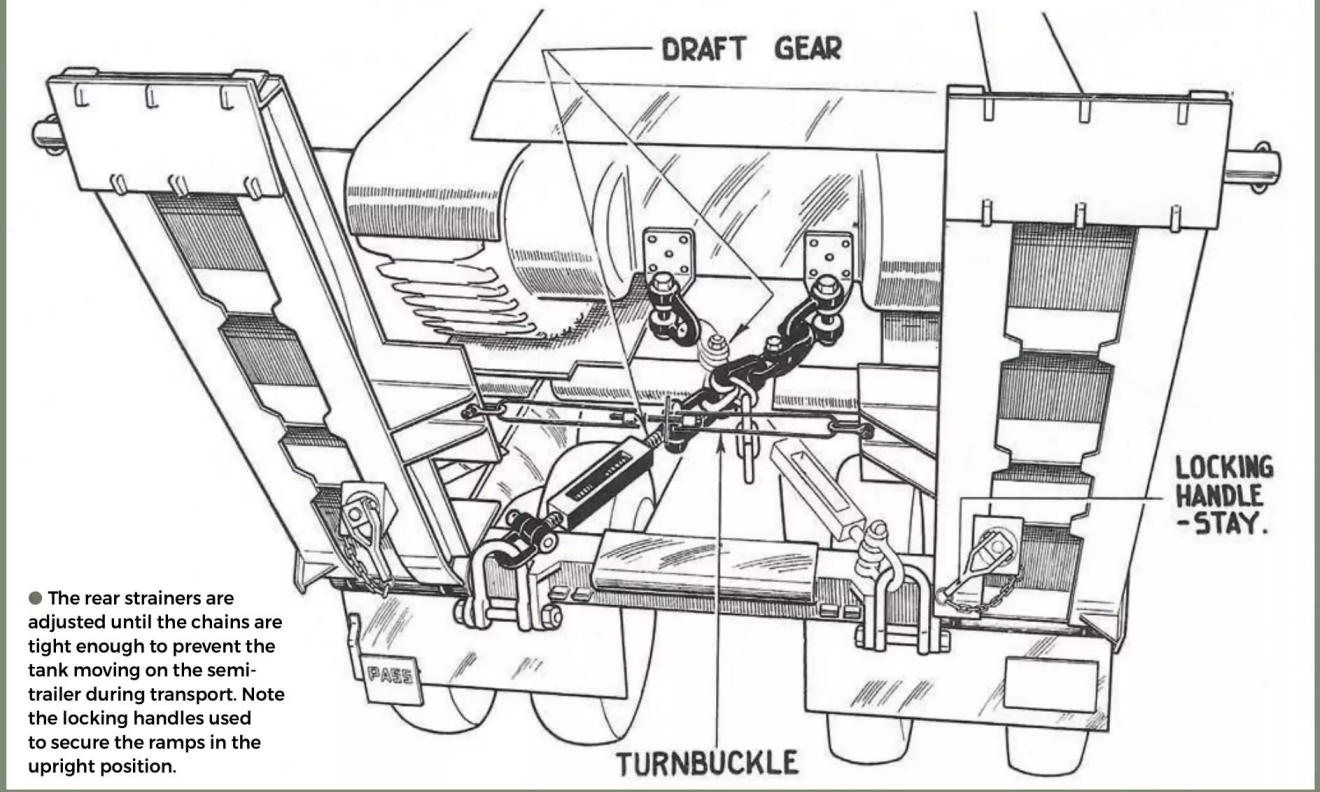


● Drawing showing the winching gear located behind the fifth wheel, showing the vertical pulley, or sheave, and twin horizontal rollers used for winching a disabled tank onto the trailer.

Navy. It had, apparently, remained in service until about 1996 in the Southampton area, at Marchwood Military Port, where it was said to have been used for pulling boats up a slipway. If the story is true, this was almost certainly the last Pioneer in military service.



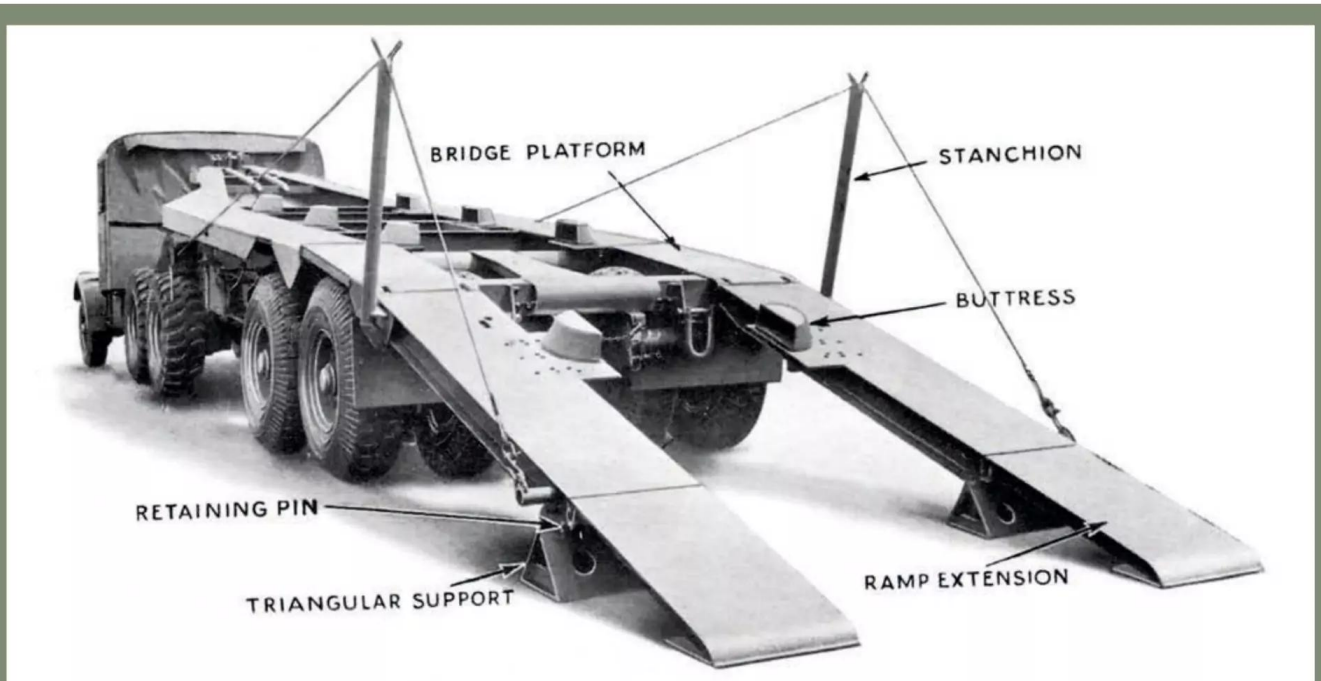
● Anchoring the front end of the tank to the nose of the semi-trailer, by means of the Hollebone yoke and a pair of snatch blocks. After passing around the lower sheave (not shown), the cable is drawn onto the drum of the winch.



● The rear strainers are adjusted until the chains are tight enough to prevent the tank moving on the semi-trailer during transport. Note the locking handles used to secure the ramps in the upright position.

● Rear view of the 30-ton semi-trailer showing the ramps in the travelling position. This outfit is one of 30 similar vehicles supplied under contract V4241 dating from 1940.

● 30-ton semi-trailer with the ramps in the loading position, with the tubular ramp cable stanchions deployed; a hand winch is provided to raise and lower the ramps, and, when not in use, the stanchions are carried in the stowage locker. The handle of a jack can just be seen behind the right-hand trailer wheels.



● 'The naming of parts'... this original 30-ton semi-trailer has the ramps lowered, with the various parts identified. The 'bridge platform' refers to the removable sections of the deck that are placed in position during the loading and unloading procedure: the bridge platforms are removed when the outfit is on the move to accommodate perpendicular movement of the rear wheels in response to the terrain.

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R.E.M.E. CENTRAL INSPECTORATE

INSPECTION STANDARDS

(PROVISIONAL)

FOR

TRACTOR, 10-ton, G.S., REC. 6x4, SCAMMELL

and

TRACTOR, 20-ton, G.S., TLR., 6x4, SCAMMELL

The Chief Inspector,
R.E.M.E. Central Inspectorate,
Kemnal Manor, Kemnal Road,
Chislehurst, Kent.

● Despite the somewhat confusing message on the cover, this is the REME 'Inspection Standards' document for the Scammell Pioneer, covering the 20-ton TRMU20/TRCU20 tank transporter, but not the 30-ton variant, as well as the SV/2S breakdown-recovery vehicle and the R100 artillery tractor. Surprisingly, the date of issue is September 1950.

● Second pattern of 30-ton semi-trailer showing how the deck is dropped either side of the trailer swan neck to reduce the loading height.

THE 'OTHER' PIONEERS

Artillery tractors and recovery vehicles

If the Pioneer was something of a disappointment as a tank transporter, this was certainly not the case for the artillery tractor and the breakdown-recovery vehicle, both of which were supplied in large numbers throughout the war, and survived another 10 or 20 years after the war was over... and both of which, later, also proved popular in 'civvy street'. Both vehicles were constructed on what was essentially the same chassis as the tank transporter, and shared a cab and automotive details, albeit the wheelbase was shorter and the gear ratios were better suited to the higher-speed roles.

A number of artillery tractors, maybe as many as a dozen, as well as smaller numbers of recovery vehicles, were abandoned in France after the evacuation of the BEF from Dunkirk in 1940 where the Germans were happy to absorb them into their own vehicle fleet. Described as *Beutefahrzeuge* – meaning 'looted vehicle' – these trucks were renumbered, and sometimes repainted. Both types went on to serve with the Wehrmacht as recovery vehicles... at least until they ran out of fuel or broke down beyond repair!

Artillery tractor

Designated R100, the Pioneer heavy artillery tractor was designed primarily as a towing vehicle for the British 7.2in howitzer which had a weight of more than 17 tons. Other towed loads include the 60-pounder gun and the 6in howitzer.

The first artillery tractor was delivered without a body in 1928, and, despite being subjected to trials, no orders were forthcoming. It wasn't until 1934 that a Pioneer artillery tractor was run in head-to-head trials against an AEC-FWD R6T and a 6x6 Leyland, with each vehicle towing a 6in gun split into two loads. The vehicles took it in turns to pull each part of the load, and the Scammell apparently provided the most impressive performance. The War Office placed an initial order for one vehicle – under contract V2811 – which was subjected to reliability trials. In late 1936, the War Office bit the bullet, as it were, and placed an order for 125 Pioneer gun tractors for the Royal Artillery. More followed over the years, with a total of 980 delivered by the end

● Early R100 heavy artillery tractor designed for towing weapons such as the 6in and 7.2in howitzers, and the 60-pounder gun. A total of 980 artillery tractors were constructed between 1935 and the end of the war; this example was supplied under contract V3610, dating from 1939.

● One of the problems with private ownership of large vehicles – and don't underestimate the size of the Pioneer in any of its forms – is that of storage, and parking a Pioneer artillery tractor on your drive is not going to endear you to the neighbours.

● Lacking the nearside cab door, and gradually shedding the poorly-brushed Deep Bronze Green paint that was applied during the post-war years, this R100 artillery tractor looks decidedly the worse for wear. Nevertheless, it is probably not beyond salvation.

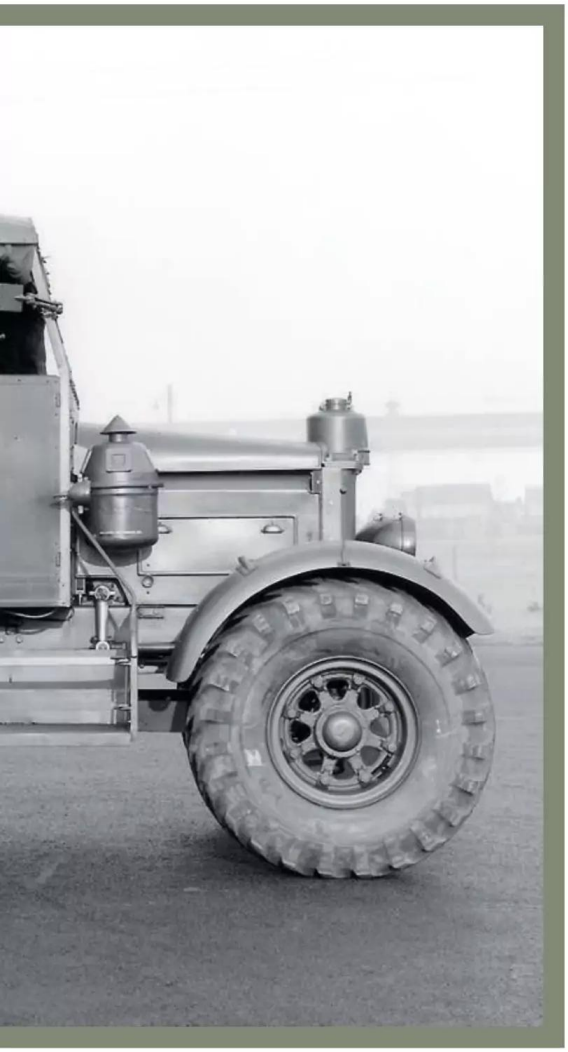
of the war, pretty much all of which were of the same pattern. The last contract, numbered S198, called for a total of 250 vehicles, but the end of the war saw this number cut to 150.

At the front end, the forward portion of the cab and the engine compartment were identical to the tank transporter, but, at the rear was a cavernous steel-panelled body, with a half-ton chain hoist on a sliding rail that extended well beyond the rear of the vehicle and which was useful when loading the vehicle, or when lifting the gun trail. The body also provided accommodation for six additional crew members on a bench seat, as well as having provision for storing ammunition and stores.

In 1938, the original R100 artillery tractor was experimentally fitted with a driven front axle and was subjected to trials at the REME Arborfield site. A second Pioneer R100 6x6 was constructed in 1945, this time by Scammell themselves, and was used

● Line-up of more than 30 factory-fresh Pioneer artillery tractors awaiting issue to the British Expeditionary Force at the Royal Army Ordnance Corps (RAOC) vehicle storage depot at Chilwell. After the BEF was rescued from the beaches at Dunkirk in 1940, some of these vehicles found themselves serving with the *Wehrmacht* where they were described as *Beutefahrzeuge*, or 'looted vehicle'.

● The spoked wheels at the front help to identify this as an early R100 artillery tractor... the census number (H385637) tells us that it was one of 61 vehicles supplied as part of contract V3208, dating from January 1938.



as a mobile test bed for the Scammell Explorer which was purchased in the post-war years to supplement the Pioneer breakdown-recovery vehicle. Numbered H6168854, the vehicle was photographed wearing chains on the front wheels and overall tracks at the rear, valiantly dragging a Crusader tank through thick mud.

After its military service, the Pioneer proved to be a favourite with circus and fairground operators.

Breakdown-recovery vehicle

Designated SV/1T, SV/1S and SV/2S, and described as 'tractor, 6x4, breakdown, heavy' by the War Office, the Pioneer breakdown vehicle was used by both the Army and the RAF.

The original SV/1T and SV/1S pattern variants were fitted with a 2-3-ton Herbert Morris collapsible crane jib crane, supported on an A-frame, designed to fold back into the body when not in use. The jib of the SV/2S

● The original prototype for the military Pioneer artillery tractor was fitted with a driven front axle, and was subjected to trials at the REME Arborfield site head-to-head with a 6x4 equivalent in 1928. Surprisingly, there was little to choose between the two in terms of performance... and such gains as were made, were at the expense of fuel consumption.

● This somewhat shabby Pioneer SV/2S breakdown-recovery vehicle has been fitted with a Scammell driven front axle. Note, also, the amended height of the engine air intake... clearly deep mud is anticipated!

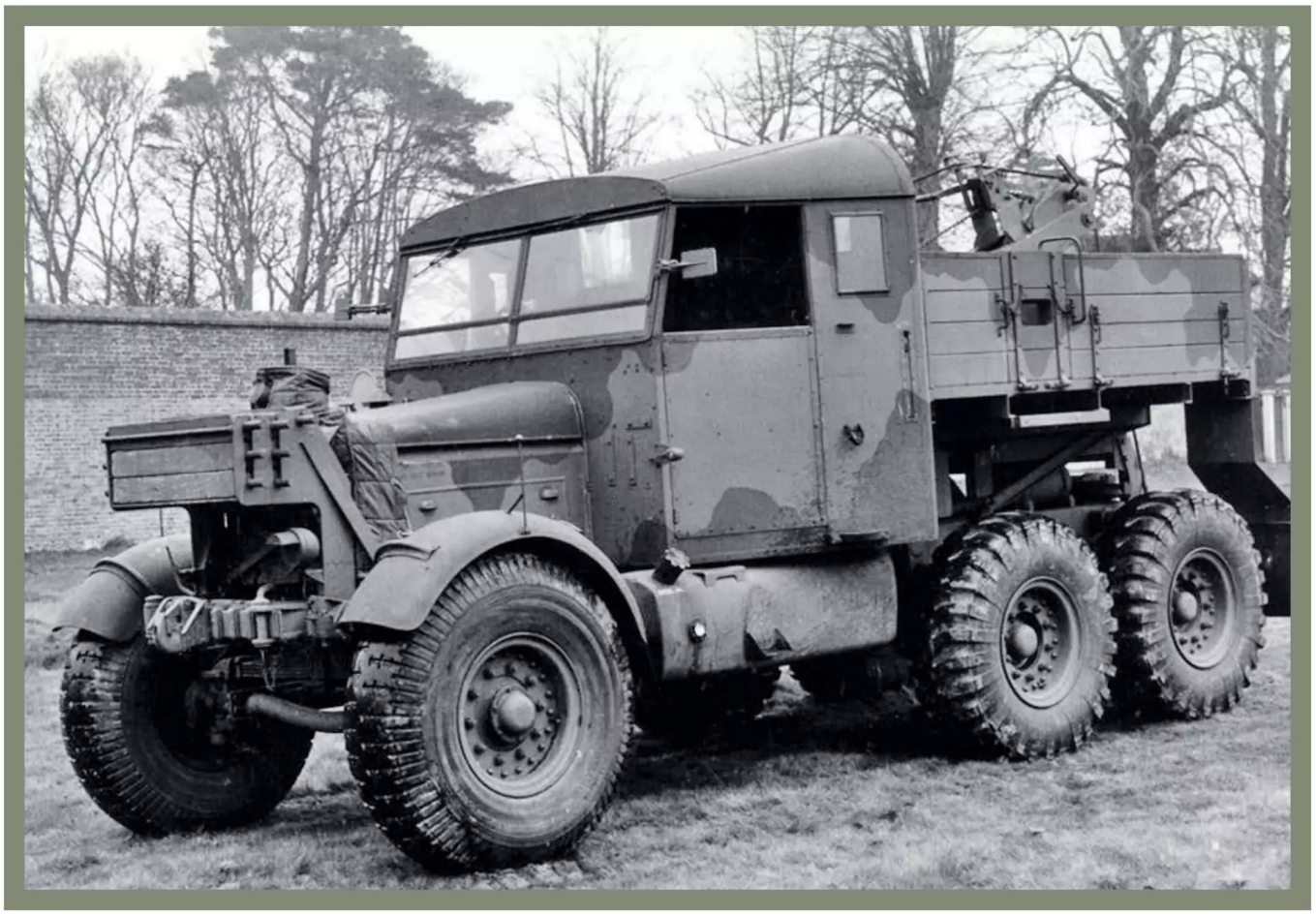
● Pioneer SV/2S breakdown-recovery tractor with the jib at full extension. In this position, the jib was rated for a lift of 2 tons (2.04 tonne); in the inner position, the rating was 3 tons (3.06 tonne).

● Privately-owned Pioneer SV/2S breakdown-recovery tractor in typical post-war ex-auction condition, indifferently painted in glossy Deep Bronze Green.

variant was designed to slide back into the body and was supported on a fixed A-frame. Steel-framed wooden-panelled lockers were installed either side of the crane. All of the recovery vehicles were fitted with a steel frame ahead of the radiator that allowed cast-iron weights to be added to help counterbalance the weight of a vehicle on suspended tow.

The first contract for the Pioneer breakdown-recovery vehicle was placed in 1936 and called for a total of 25 vehicles. More contracts followed, and, from about mid-1940, production was running at the rate of four vehicles a month. The breakdown-recovery vehicle was the most numerous of the Pioneer variants, and total production of all three types amounted to 2018, of which 43 were of the SV/1T and SV/1S variants, with the remaining 1975 being of the SV/2S variant. The last contract was dated July 1945.

At least two Pioneer breakdown-recovery vehicles were also converted to all-wheel drive and were put through their paces at the Mechanisation Experimental Establishment.



● Unique amongst the three Pioneer variants, the breakdown-recovery vehicle was fitted with a substantial frame ahead of the radiator that allowed up to seven 150 lb (70kg) cast-iron weights to be added to counterbalance the weight of a vehicle on suspended tow.

● Compact and business-like, this photograph shows off the attractively-proportioned front end of the SV/2S breakdown-recovery vehicle.

Although the recovery equipment was a little cumbersome in use, the Pioneer breakdown-recovery vehicle remained in service in quantity until well into the 'fifties when it started to be replaced by the Scammell Explorer and then by the AEC Militant Mk 3. The last example, nicknamed 'Swampy' and located at the British Army garrison in Belize (formerly British Honduras) did not leave service until the mid-eighties... and still survives as part of the REME Historic Vehicle Collection.

● Pioneer SV/2S breakdown-recovery vehicle acting as a tank transporter with a Valentine infantry tank Mk III on an 18- or 20-ton drawbar trailer.

ALL THE FUN OF THE FAIR!

Fairgrounds, road surfacing and oversized loads

Between July 1946 and June 1983, surplus War Office vehicles were disposed of through a series of 179 massive auction sales held every eight weeks at the Ordnance Storage and Disposal Depot at Ruddington. Most of these sales were scheduled to take three days, but a large sale might extend across four or even five days. Other sales were held at regional depots, including Great Missenden, Branston, USAF Dorchester, Winchester, Colchester, Glasgow, Bordon and other locations. The auctions were publicly advertised in the press, and, although primarily aimed at dealers, the sales were open to the public and anyone was free to bid.

● A pair of surplus Pioneer 30-ton tank transporters, together with an R100 artillery tractor, awaiting disposal. The left-hand tank transporter was one of 150 supplied under contract S3185, dated May 1943.

On day one of that first Ruddington sale back in 1946, some 246 vehicles went under the hammer, including one 30-ton Scammell Pioneer tank transporter. With plenty of wartime vehicles to choose from over the years, the Pioneer rapidly became the most popular of the company's products... well, at least, for those who couldn't afford the purpose-designed post-war products, and many Pioneers thus found new careers outside of the services... often putting in more years with their new owners than were already behind them.

But, after many more years' service, the old warriors started to show their age. With parts probably becoming

● Complete with the obligatory generator set in place of the fifth wheel, this Pioneer enjoyed a second career with the fairground. In most other respects the tractor is in the same condition in which it left the services.

● Belonging to R Edwards & Sons of Swindon, and nicely identified as a Scammell, this ex-tank transporter has been fitted with a ballast box at the rear, and has an A-frame mounted on the front chassis extensions to help erect the ride.

● Looking decidedly the worse for wear, this is one of the REME ballast-tractor conversions that ended its working life with a fairground. Note the typical Deep Bronze Green paintwork showing through where the red has worn away.

● Nicknamed 'Challenger', this tractor belongs to Bensons Super Amusements of Dorking. At a glance it more closely resembles the R100 artillery tractor, but the length of the wheelbase and the cab extension give the game away. Note how the air tank for the brakes has been moved from behind the cab into the stowage basket.

● The script legend on the cab door suggests that this could be another Pioneer that belonged to R Edwards & Sons. Note how the generator set occupies the position previously allotted to the fifth wheel and also protrudes into the cab.

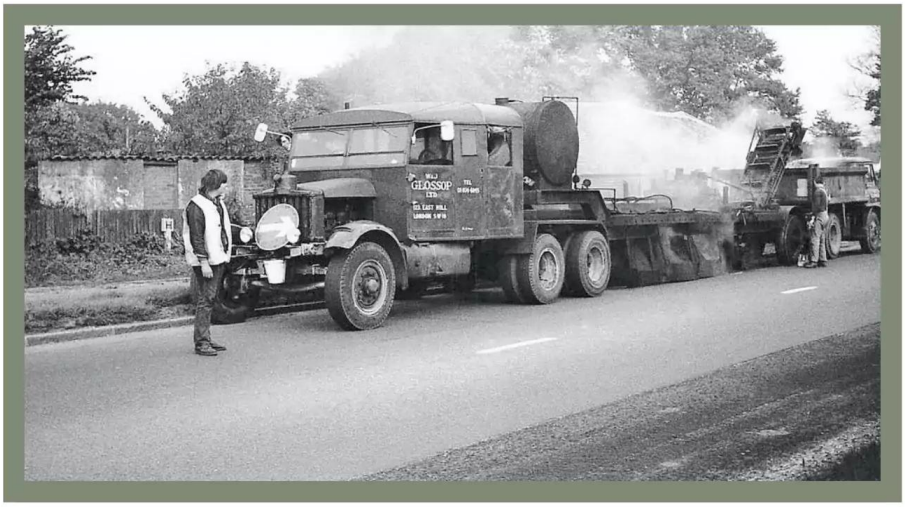
scarce, and modern vehicles offering better fuel consumption and all-round performance, the days of the Pioneer were beginning to be numbered. However, old Pioneers never really die, and many were simply put to one side, languishing in showmen's winter quarters or in the backs of scrapyards... simply awaiting the magic touch of the enthusiast restorer!

Fairground operators

Owners and operators of fairground rides tend to need large-bodied towing vehicles with sufficient off-road performance to pull a heavy ride onto a grassy pitch in the wet. The body must be large enough to accommodate the stripped-down ride, as well as providing space for a generator set, the latter often consisting of the engine – commonly a Gardner LW Series – and radiator taken from an old bus. And finally, the vehicle needs to have sufficient power to tow a large living van, plus perhaps another trailer.

The Pioneer was the perfect choice on all fronts, and particularly as a replacement for a steam engine. Indeed, the artillery tractor, with its capacious rear body must have seemed purpose-made to house both a generator and the components of the ride. The breakdown-recovery variant was also popular, but, there were plenty of fairground operators who favoured the tank transporter. Examples include Alexander Drummond, Roland Tucker Amusements of Makefield and Elmsall, and Wallis's Fun Fair, all of whom adapted the tractor to carry a Waltzer ride. Other fairground users include Pat Collins, Richard Bourne's 20th Century Amusements, Anderton & Rowlands, T Whitelegg & Sons, and R Edwards & Sons, who, like many others, contrived to fit an A-frame crane in place of the front tow hitch to help assemble the ride, and put a generator set over the fifth wheel.

Benson's Super Amusements operated several customised artillery tractors – one of which appeared in the 1973 film



● Belonging to road-surfacing contractors W & J Glossop, this Pioneer is coupled to a specialised 'burner' trailer designed to strip the worn surface from the road, discharging it to an open truck by a loading elevator. The tractor is in surprisingly straight condition bearing in mind the work that it is undertaking.

● Another road-making tractor belonging to Glossops, this one looking slightly battered and under-shod with its single rear tyres. Note the huge fuel tank mounted over the fifth wheel.

● Now into its third ownership, this ex-Glossops tractor has passed into private hands, where, unlike many ex-military vehicles, it has been preserved in the livery of its second owner.

'*Digby, the Biggest Dog in the World*' – but they also had a tank transporter with a well-constructed rear body which matched their other vehicles, and that looked, at first glance, like a long-wheelbase artillery tractor.

Highway contractors

Road surfacing was another activity at which the Pioneer excelled, presumably because of its ultra-low gearing. In the 'sixties, the self-styled 'Kings of Tarspraying', road-surfacing contractors W & J Glossop – originally of Halifax, but eventually with depots in the south – used a small fleet of what, over the passage of a number of years, became increasingly-battered tank transporters. Generally equipped with smaller wheels and tyres, the tractors were coupled to specialised hot-box, or 'burner', trailers for stripping the worn surface from the road, with a huge fuel tank mounted behind the cab on the trailer swan neck.

● Another Glossops tractor and trailer, this time parked up for the night and 'protected' by real old-fashioned road-mender's lamps. The truck looks extremely well worn, especially the cab!

● Extensively-repanelled 30-ton tractor, proudly wearing a 'Scammell' badge on the roof panel. Note the sliding cab window... real luxury for the Pioneer driver!

● This is another example of a tank transporter that has been rebodied with what could be considered as a version of the R100 artillery tractor body... the placement of the number-plate is interesting.

● The Pioneers belonging to Bensons Super Amusements were always well turned out as evidenced by this view of 'Challenger', a rebodied tank transporter... note the stylish 'tail-end' treatment.

● For comparison, here's another Pioneer, this time an R100 artillery tractor with with a less flamboyant variation of the tail-end treatment already illustrated. Once again, the air receiver for the braking system has been moved to the stowage box, and the front mudguards appear to be longer than normal.

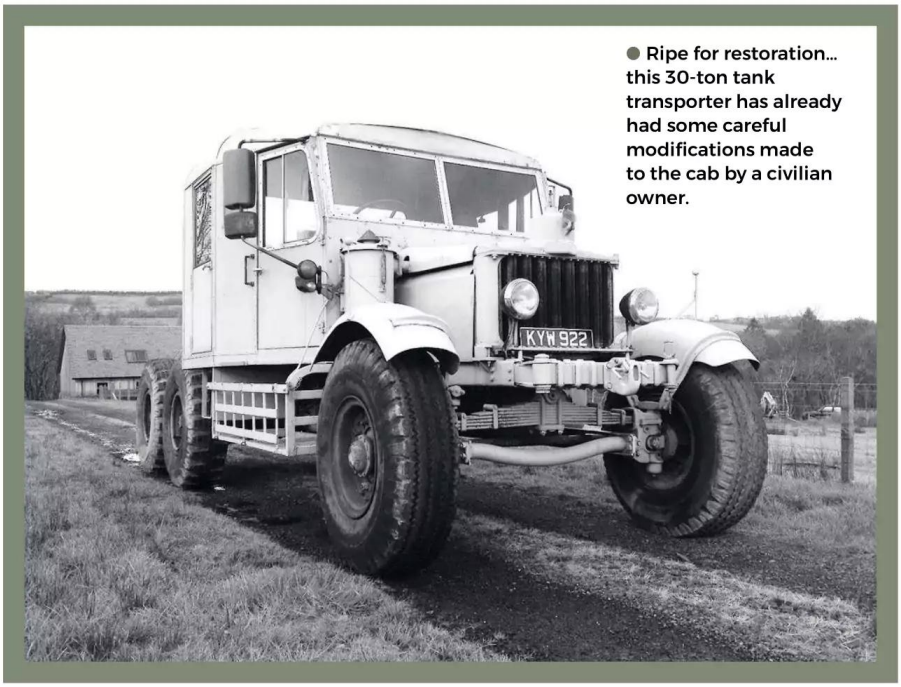
● Although strictly speaking this Pioneer, belonging to Vic Watkins of Hastings, New Zealand, has no place in this publication because it started life as an R100 artillery tractor... but who can resist the sight of a Pioneer moving a house!

The existing tarmac was heated before being scraped off and discharged to an open truck by a loading elevator, in a process that, today, would be called hot planing.

Contractors East Anglian Roadstone & Transport Company (EARAT), of Postwick, Norfolk, also used a Pioneer for a similar purpose.

Heavy haulage

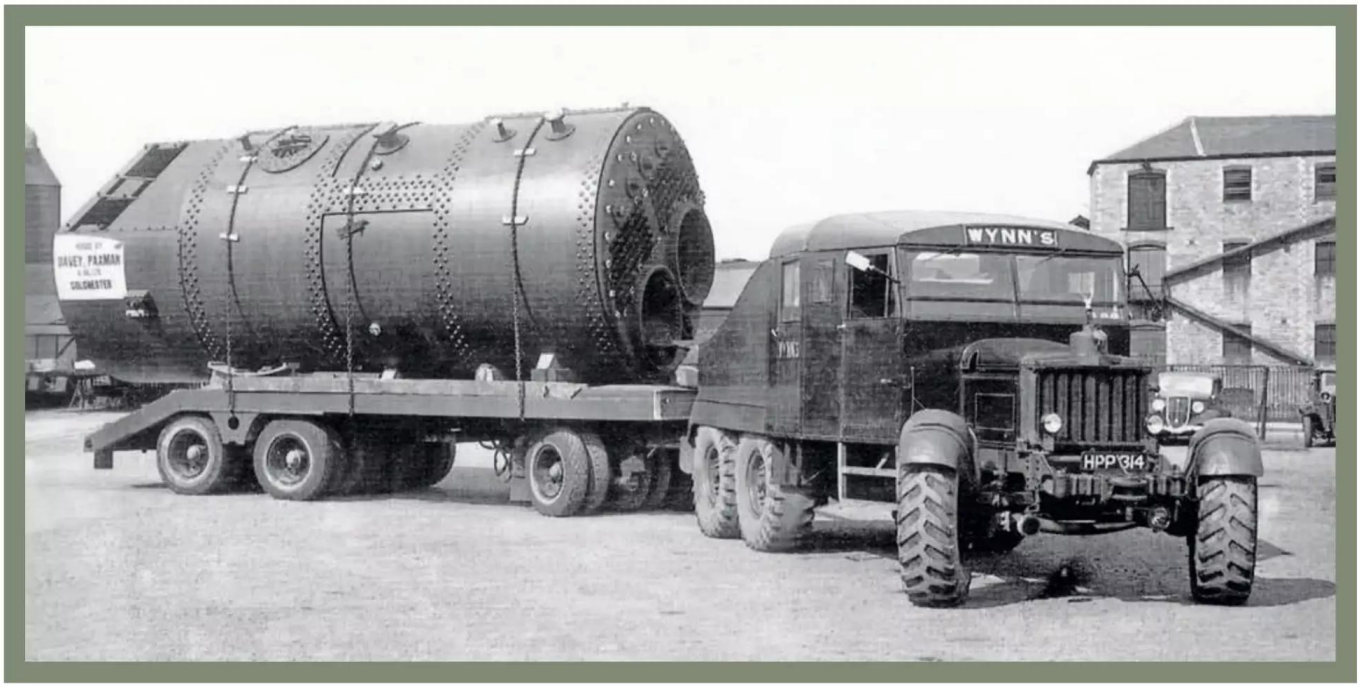
Amongst the better-known heavy-haulage operators, Robert Wynn & Sons had two Pioneer tank transporters, and a single breakdown-recovery vehicle. All three had been purchased at auction in 1946/47. The vehicles were subsequently rebuilt to better suit their new role, most notably by the removal of the fifth wheel and the attachment of a ballast box, and, at least one of them was fitted with a larger radiator. However, if the truth were told, the company preferred the more powerful Diamond Ts and Pacific M26 'Dragon Wagons', both of them far more capable... and both of them with front-wheel brakes! Arch-rivals Pickfords operated both converted tank transporters and some



● Ripe for restoration... this 30-ton tank transporter has already had some careful modifications made to the cab by a civilian owner.

new Pioneer 80 tractors, whilst EW Rudd also favoured the Pioneer 80, as did George Wimpey, and Hills of Botley. In Edinburgh, JR Carmichael had a 30-ton tank transporter that was used for heavy haulage work, as did John Silbermann Limited. Richard Head of Longhope, Gloucestershire, had a TRMU30 that had been fitted with a Harvey Frost crane for use as a heavy recovery vehicle. And, finally, one of the post-war ballast body conversions survived into 'civvy street', ending up

● In the immediate post-war years, Robert Wynn & Sons of Newport, better known simply as Wynns, tended to favour Diamond T and Pacific M26 'Dragon Wagon' tractors... but they did own a couple of Pioneer tank transporters, one of which is shown here in extensively modified form, and a breakdown-recovery tractor.



● Here is Wynns' other Pioneer tank transporter in somewhat better condition... although look at the tyre on the forward driving axle! The tractor is being operated as a prime mover for a heavy boiler, coupled to an ex-military 40-ton trailer.

● In 1945, following VE Day, all outstanding contracts for Pioneers were cancelled. A number of partly-completed tractors were rebodied and converted to what was described as the 'Pioneer 80'. This example, coupled to a Rogers 45-ton tank-transporter trailer, belongs to Hills of Botley.

● Another Pioneer 80, this time belonging to EW Rudd. Note how the general appearance of the military Pioneer has been retained despite the cab being increased in width.

● As well as buying some new Pioneer 80 ballast tractors, Pickfords also converted some wartime tank transporters to the same configuration.

PICKFORDS
PICKFORDS
PICKFORDS

● A Pickfords' Pioneer 80 threading a massive fractionating column through central London.

with Metcalfes of Thirsk, and at least one – maybe the same one – has passed into preservation.

On the other side of the world, the Public Works Department of Wellington, New Zealand, included a Pioneer tank transporter on their fleet, which had been fitted with a ballast body over the fifth wheel, and Vic Watkins Building Movers, also of New Zealand, favoured Pioneers, albeit generally modified artillery tractors – but always retaining the original Gardner engine.

● Very nicely presented Pioneer 30-ton tank transporter owned by Leith-based company JR Carmichael of Edinburgh and employed for heavy-haulage duties.

A NEW LEASE OF LIFE

The Pioneer in preservation

Restoring a vehicle that is the size and weight of a Pioneer is a daunting task... and yet, many of these vehicles are in private hands. Although the manufacturer shut up shop some 30 or more years ago, meaning that factory support is no longer available, there is the usual network of enthusiasts, always keen to pitch in and help solve problems. Parts will not always be easy to find, but at least Gardner Parts (www.gardnerspares.com) can help with the engine, and the cab is of simple wood and metal construction, meaning that it can be reconstructed by a skilled amateur.

● And this is how the candidates for restoration still occasionally turn-up... 75 years after the end of WW2!

However, one of the very real problems with wanting to buy a Pioneer tank transporter is the difficulty of finding examples for sale... that, and finding somewhere to store it! A surprising number of Pioneer artillery tractors and breakdown-recovery vehicles have survived, but the truth is that the tank transporter is as rare as the proverbial hen's teeth, and the correct semi-trailer is rarer still.

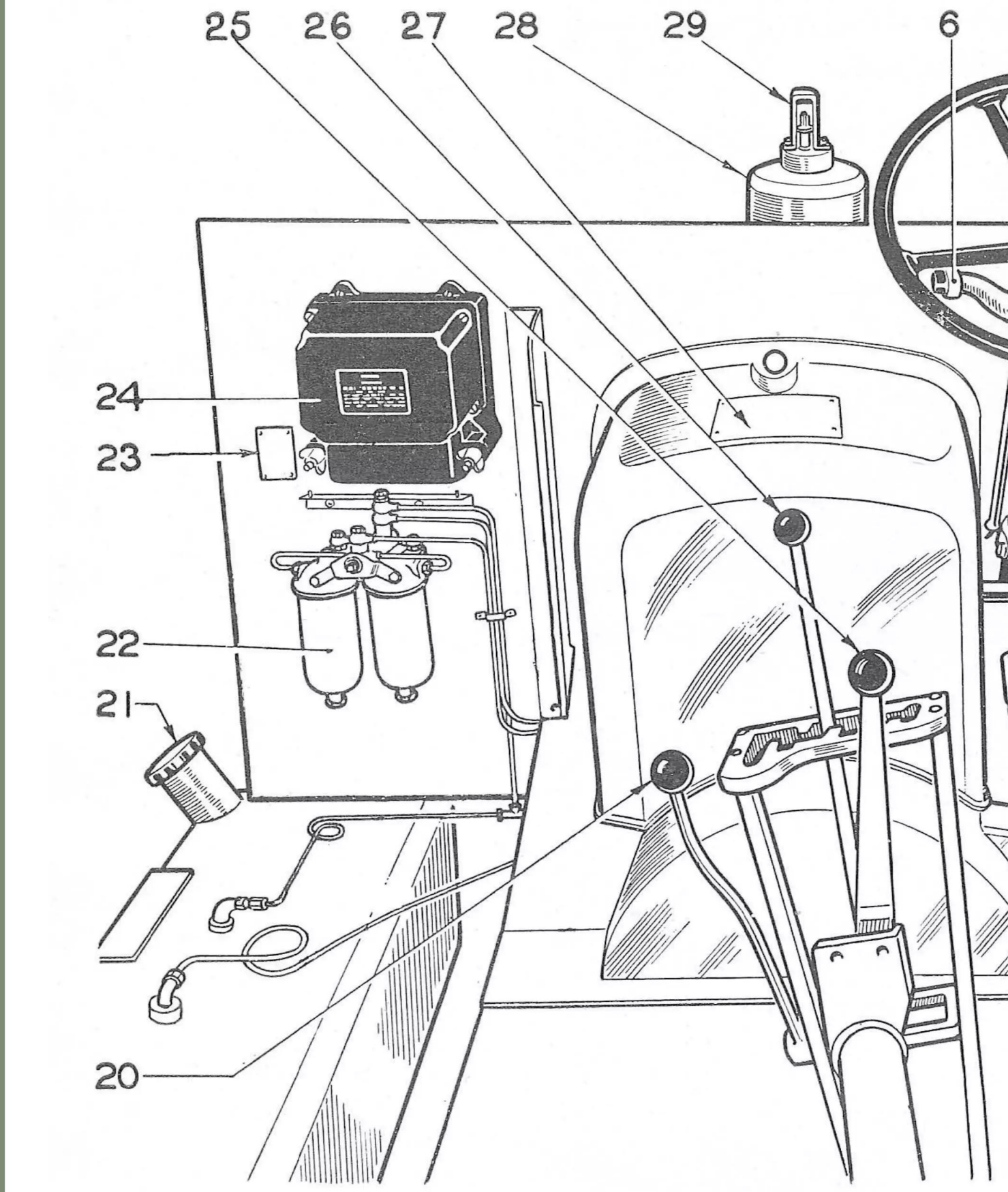
The website 'www.car-from-uk.com' recently had a very rough 20-ton tractor for sale at £2895. That might seem to be a very reasonable price, but judging from the photographs it requires a huge amount of work. Another example, incomplete and said to be the former property of W & J Glossop, was offered for sale on the internet at £1000 some four or five years ago... the vehicle was based in Somerset and, again, a lot of work would have been required to make it presentable. And recently, there was a 'sound but scruffy' running example of the 30-ton tractor for sale on Milweb (*www.milweb.net*), complete with the lower part of the fifth wheel, at £6000.

At the other end of the scale, a very nicely-restored 30-ton tractor with a modified post-war Dyson semi-trailer was offered for sale in the summer of 2019 on the Historic Military Vehicle Forum (*www.hmvf.co.uk*)... 'realistic offers please'.

Inside the cab

Having caught your Pioneer, you will be eager to drive it, and putting yourself behind the wheel means clambering over the right-hand stowage basket and hauling yourself up into the surprisingly-narrow cab.

Once in the cab you will understand why the Pioneer is sometimes referred to as 'semi forward control' – the engine is placed well back in the frame, with the two rearmost cylinders effectively behind the firewall, and the flywheel cover actually intrudes into the floor space. The interior is dominated by a large steering wheel, with a hand throttle control on the right-hand side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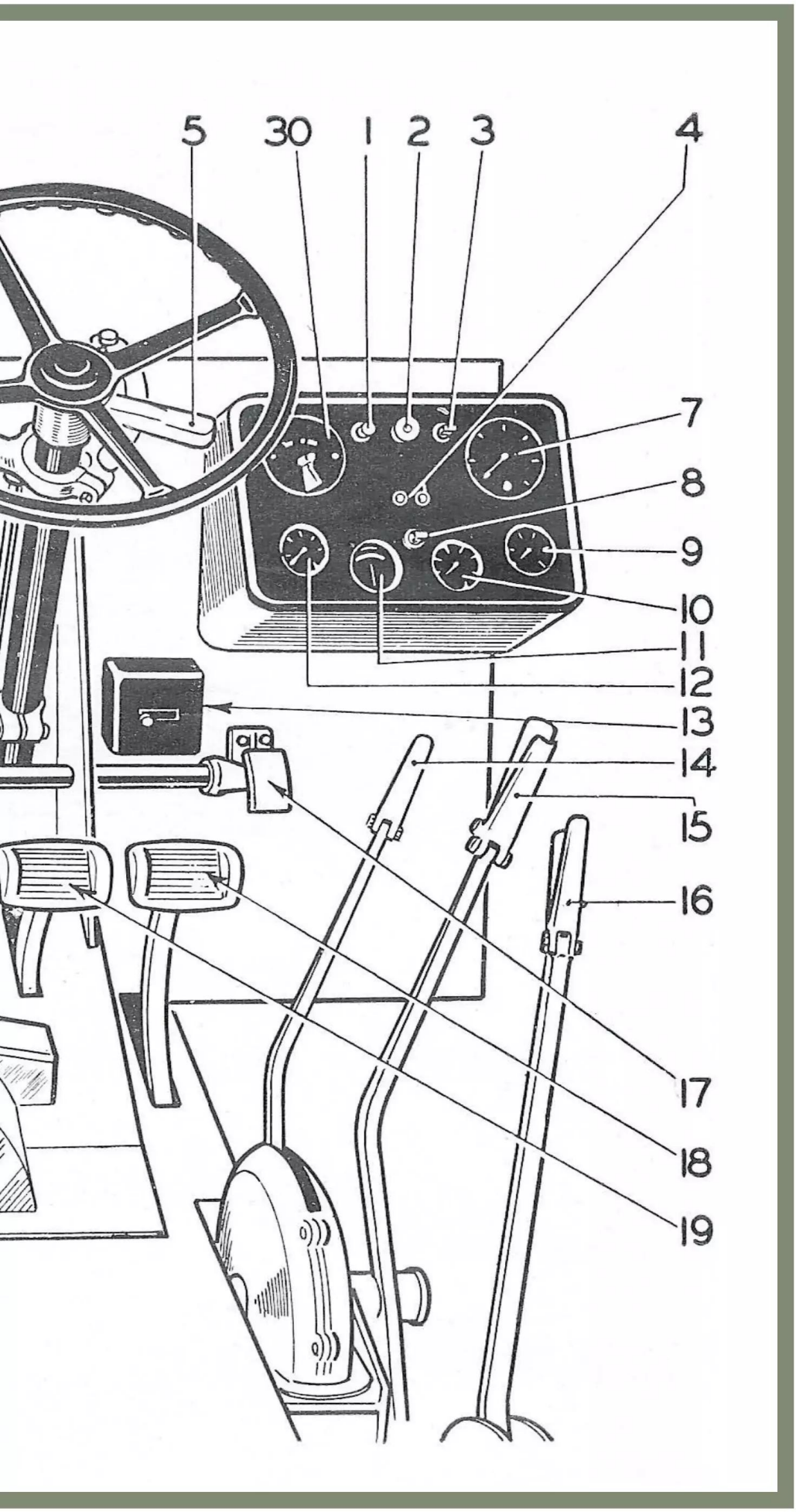


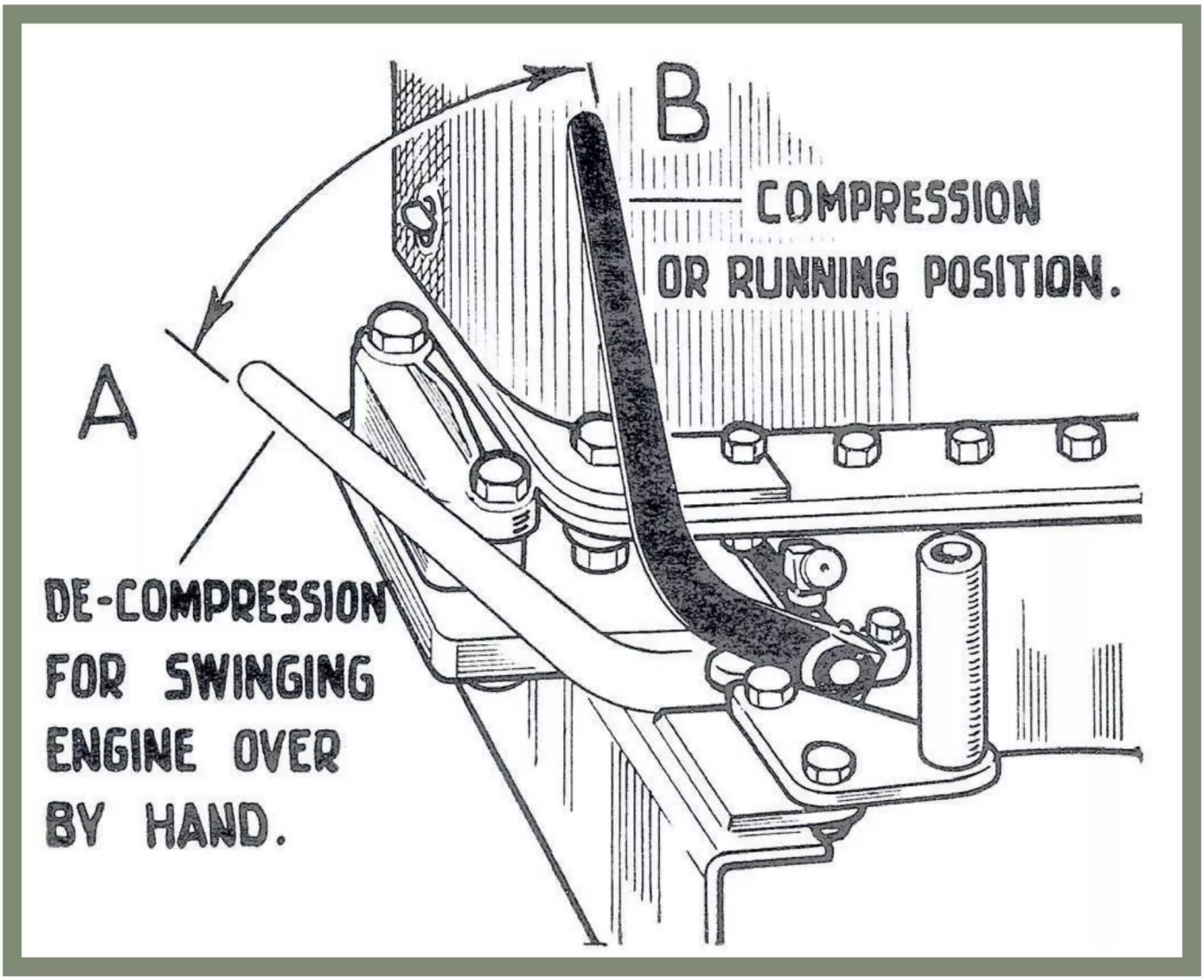
● Excellent view of the driving compartment and controls.

1 Starter switch
2 Engine stop control
3 Panel light switch
4 Inspection lamp sockets
5 Hand throttle control
6 Horn button
7 Speedometer
8 Stop lamp isolator (early examples)
9 Gearbox oil-pressure gauge
10 Engine oil-pressure gauge
11 Ammeter
12 Braking system air-pressure gauge
13 Fuse box
14 Neate brake lever
15 Transmission brake lever
16 Winch brake lever
17 Accelerator pedal
18 Foot brake pedal
19 Clutch pedal
20 Winch drive-selector lever
21 Fuel tank filler
22 Fuel filters
23 Data plate for fuel filters
24 Voltage control box
25 Winch clutch lever
26 Gear-change lever
27 Data plate showing controls
28 Radiator filler
29 Water-level indicator
30 Lighting switch

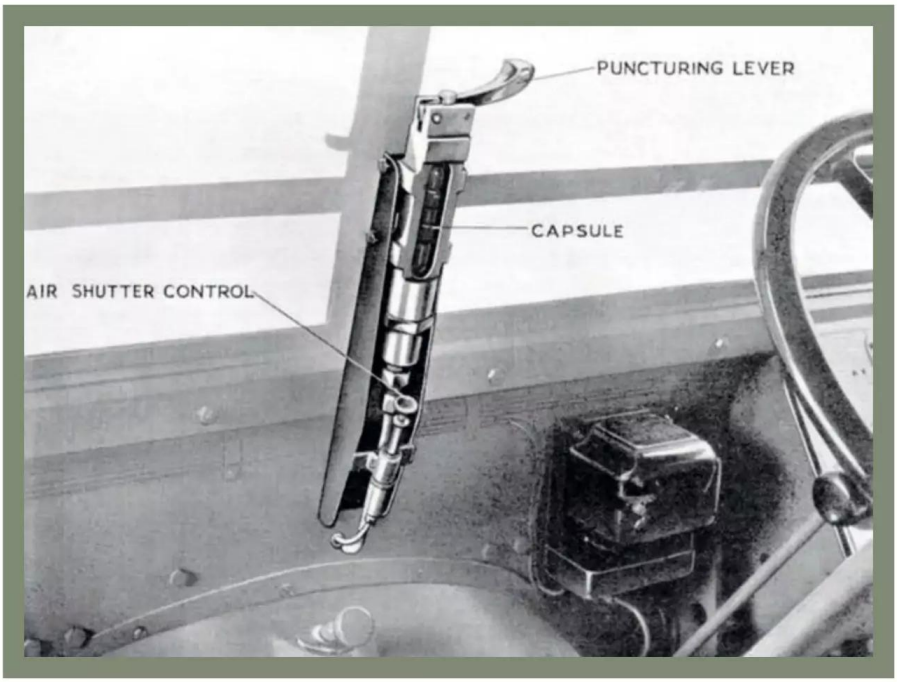
of the column. In front of you, and slightly to the right, is the instrument panel, furnished with a speedometer, and gauges for the braking system air-pressure, gearbox oil pressure, and engine oil pressure, plus an ammeter. Controls for the winch clutch, and the winch drive, are to your left, along with the open-gated gear-change, with six gear positions and three neutrals. The handbrakes and the winch brake are to your right. Ahead of the passenger seats there is a pair of fuel filters, and the voltage control box.

The Pioneer is almost completely devoid of creature comforts; the cab windows are unglazed, apart from the small lights behind the front seats, and the cab is open to the elements at the sides and at the rear. The seats are small and unsupportive, and there is no acoustic or thermal insulation so you can enjoy the symphony of the engine and transmission... and, of course, you'll have plenty of time to do this on the ride!

There is no key, but the vehicle is started by checking that the decompression lever on the engine block is set to the second position, and simply pressing the starter button. Should you be sufficiently unlucky as to have to start the vehicle by hand, then the decompression lever is set to the



● Decompression lever for manual starting. Position 'A' prevents the valves closing, resulting in minimal compression and easy manual starting; 'B' shows the correct position for the lever when the engine is running or the electric starter motor is in use.



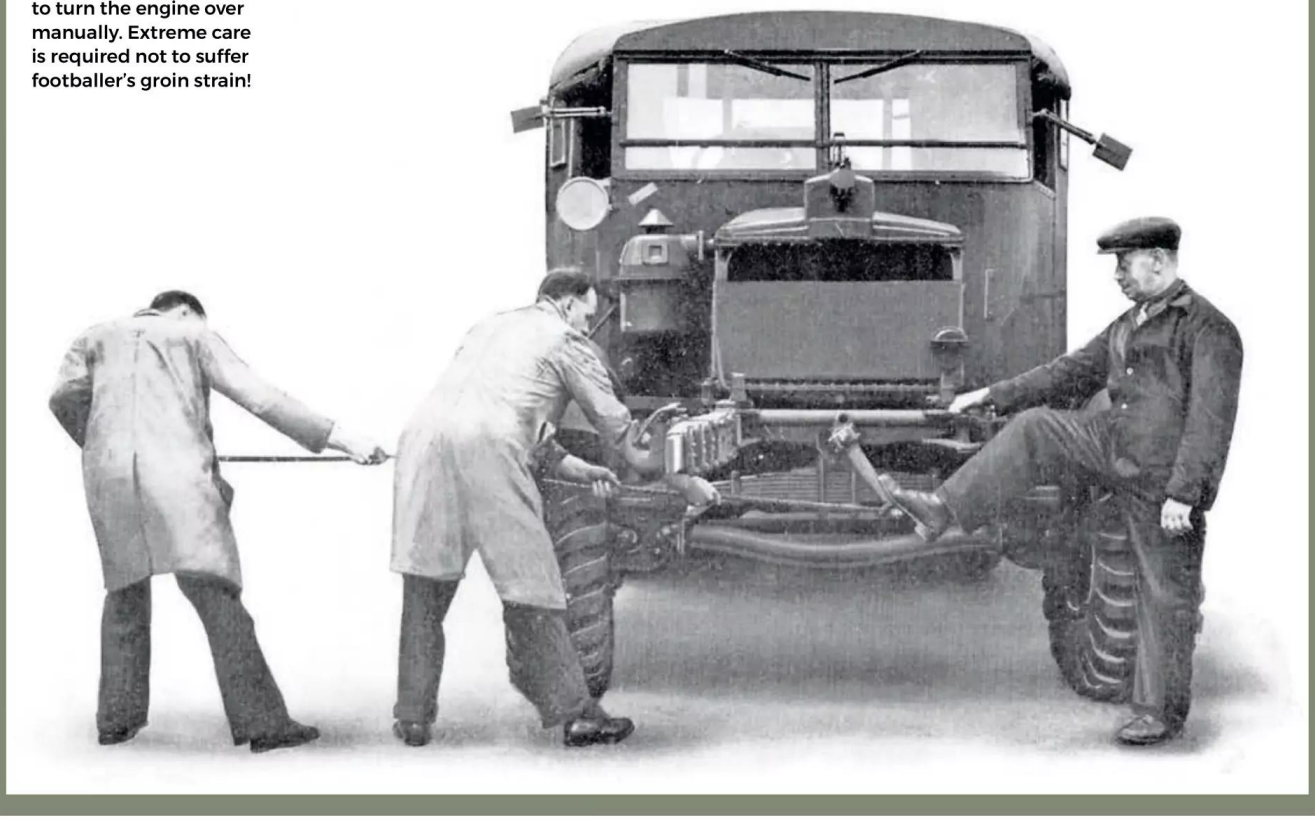
● Ether carburettor control. A capsule of ether is inserted into the device and punctured by the lever at the top; ether is introduced into the engine to aid starting in extreme cold conditions.

first position, and three men must be persuaded to pull the engine over with the aid of a stout rope and a judiciously-placed foot.

The official Driver's Handbook insists that the engine will start on the first or second compression stroke, and, once the Neate brake has been released, the gear lever can be placed in second and away you go. First gear is reserved for pulling away under difficult conditions, or with a load.

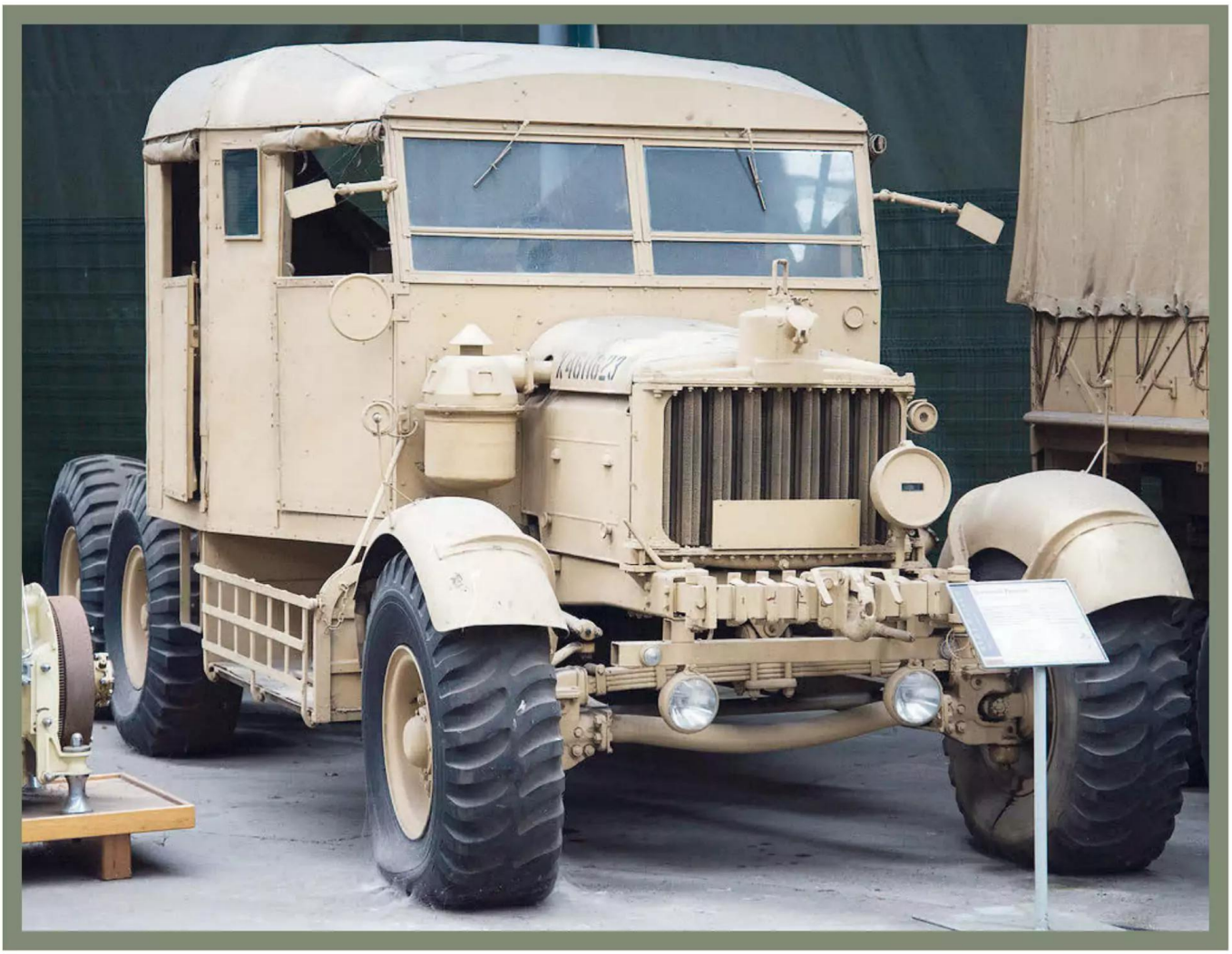
On the road

Once on the road, you will immediately be aware that the Pioneer tank transporter is slow... very slow. No matter how hard the accelerator is pressed to the floor, 15mph (25km/h) is all that is available... and you need a Zen-like calm to drive it. There are no front-wheel brakes, and the clutch and steering lack power assistance. The



● It requires three men and a length of stout rope to turn the engine over manually. Extreme care is required not to suffer footballer's groin strain!

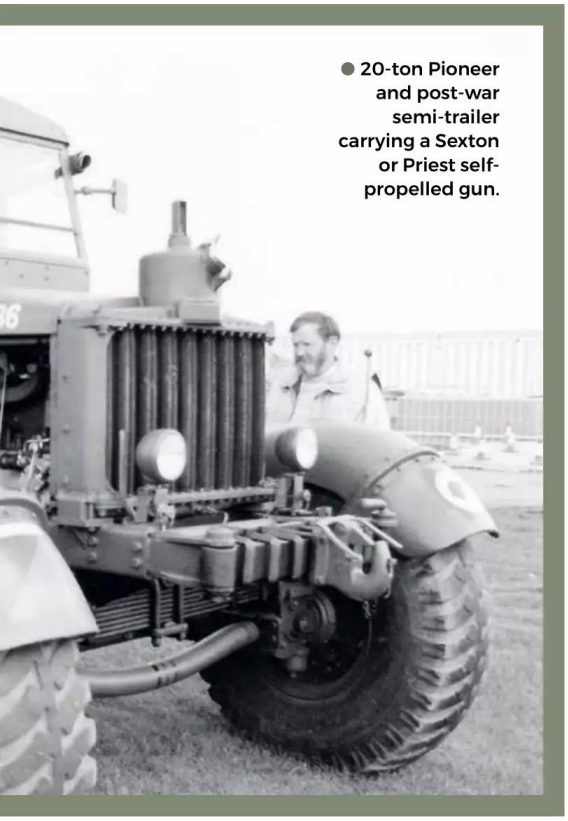
● This well-restored Pioneer tank transporter, complete with 30-ton trailer, has become well known on the rally circuit. The load is a post-war Soviet BMP-1 amphibious infantry fighting vehicle.



● Looking a little tired and cobwebby around the wheels, this tank transporter was photographed at the REME Museum. The side lights and the lower headlights are later additions.

● Two types of engine air filter were used; this is the pressed-steel version. The other was of cast construction.

● Marked as belonging to the Royal Navy, this Pioneer was used at Marchwood Military Port to pull boats up a slipway, remaining in service there until about 1996. It has subsequently been restored in this blue livery.



● 20-ton Pioneer and post-war semi-trailer carrying a Sexton or Priest self-propelled gun.

gear ratios are so low that no speed will be registered on the speedometer until you have changed into fourth, an event which happens at around 2.5-3mph (4-5km/h). The change into sixth gear should be made at 7-9mph (11-15km/h).

The maximum speed of 15mph (25km/h) must not be exceeded even on downhill gradients. The Driver's Handbook suggests that 'on a long hill, the Neate brake should be applied to

● Restored by LD and LM Simmonds, this early 20-ton Pioneer has been maintained in the house red colouring of road-surfacing contractors, W & J Glossop.

● Tank transporters are rare enough... to find one with the correct semi-trailer, if not exactly gold dust, is certainly a cause for celebration.

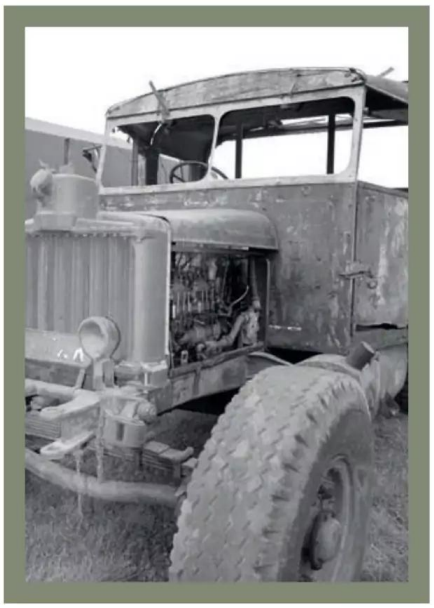
maintain the vehicle at a steady speed, keeping the foot brake for emergency, and the transmission brake as a last resort'!

You will notice that the Pioneer is also somewhat larger than the average truck, and driving a vehicle of this size is not an exercise to be undertaken lightly. If you are seriously planning to drive the beast on the public highway, you will need a flashing amber beacon and a 'slow vehicle' warning sign. Consider also, whether it might be sensible to first of all undertake some commercial-vehicle driver training to improve spatial awareness and manoeuvring skill.

And finally, don't even think about the cost of recovering the tractor after a breakdown... join the RAC and subscribe to their scheme of breakdown cover for vehicles up to 44 tons (45 tonne) in weight. Getting caught out, without the benefit of such insurance, or, for that matter, without something like a REME light aid detachment behind you, will be an expensive business.

● (LEFT) Looking for all the world as though it has reached the end of its useful life, this tank-transporter tractor has already suffered the indignity of being fitted with a large recovery crane... but now the sheet metalwork is literally falling to pieces. They can be saved from this condition!

● (BELOW) Nicknamed 'Block Buster', this is one of the handful of tank-transporter tractors that were converted to ballast tractors by REME in the early-fifties.



● Someone is trying hard – or has tried hard – to rebuild this cab.

● Another shot of 'Aurora', the REME Museum's tank transporter, this time holding up the traffic as it takes part in a road run.

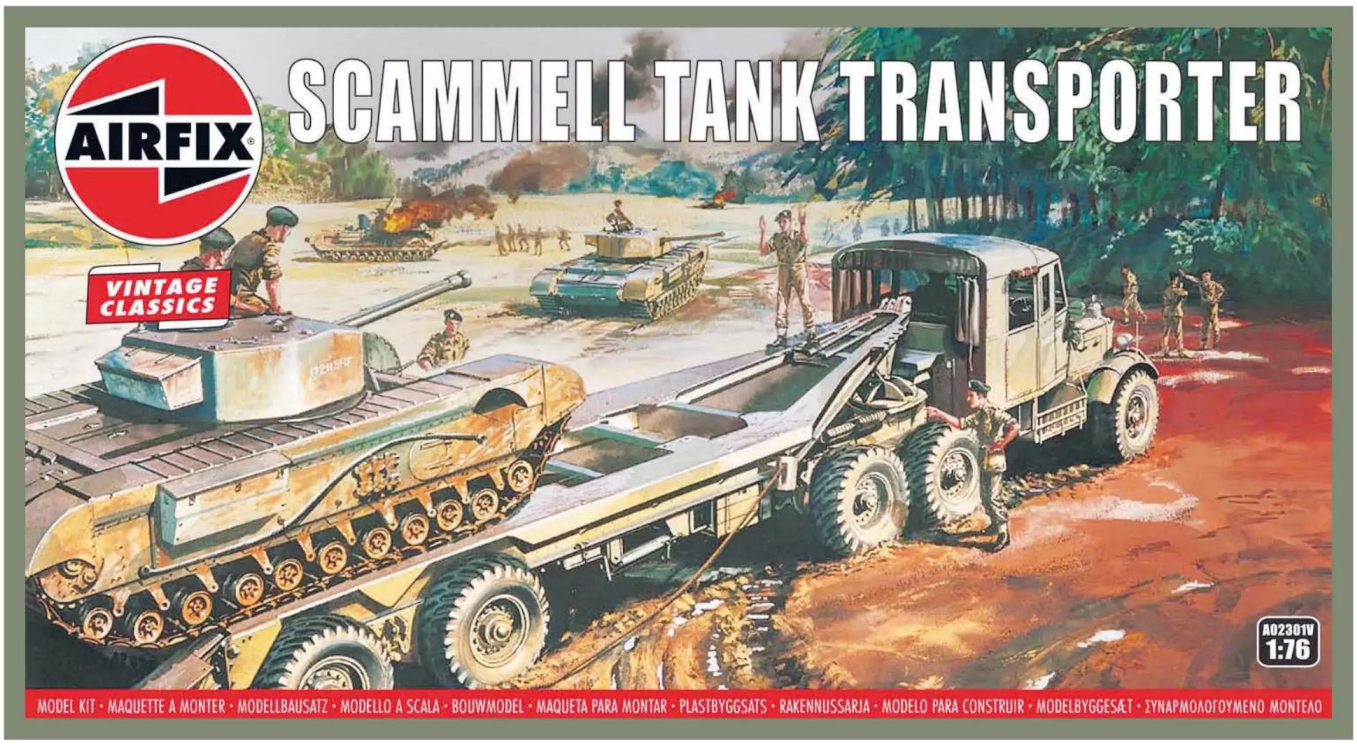
● Despite lacking mudguards, windscreen, bonnet sides and all kinds of smaller parts, this Pioneer made it to the War & Peace Show... and it will rise again.

● The Pioneer is always an impressive sight... from almost any angle.

● Red-and-white painted hand-operated semaphore signal... on the left hand side of the tractor only!

● (ABOVE) 30-ton Pioneer injection-moulded plastic construction kit at 1:35 scale from Thunder Models.

● (LEFT) REME Museum again... this time with the aid of a substantial towbar.


AIRFIX
SCAMMELL TANK TRANSPORTER
VINTAGE CLASSICS
A02301V
1:76
MODEL KIT • MAQUETTE A MONTER • MODELLBAUSATZ • MODELLO A SCALA • BOUWMODEL • MAQUETA PARA MONTAR • PLASTBYGGSATS • RAKENNUSSARJA • MODELO PARA CONSTRUIR • MODELBYGGESÆT • ΣΥΝΑΡΜΟΛΟΓΟΥΜΕΝΟ ΜΟΝΤΕΛΟ

● Airfix can always be relied upon to come up with the goods... here, at 1:76 scale, is the 30-ton tank transporter.

● Thunder Models... the finished article.

● 30-ton Pioneer tank transporter, resplendent in post-war Deep Bronze Green... what a handsome beast!

Models

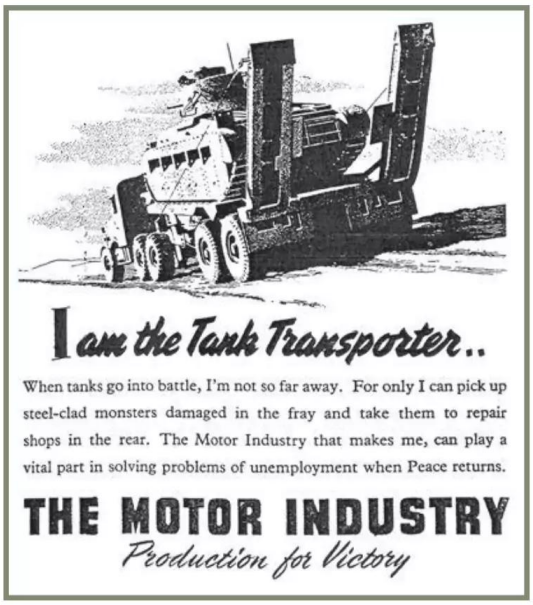
If you can't afford the real thing, or have nowhere to keep it, you'll be pleased to hear that the Pioneer is well served as regards models, with examples of all three variants – tank transporter, artillery tractor and breakdown-recovery vehicle – readily available. The following list includes tank transporter kits and models at various scales:

- Accurate Armour; kit K100; resin castings and etched brass; scale 1:35
- Airfix; kit A02301V; injection-moulded plastic; scale 1:76
- Arctic Skunk; kit FW07; 3D printed resin; scale 1:100
- Arrowhead Miniatures; white metal castings; scale 1:144
- Fairground Models; kit 4045; white metal castings and etched brass; scale 1:76
- Hart Models; white metal castings
- Hartsmith; kit HT63; white metal and resin castings; scale 1:48
- IBG Models; kit 35031; injection-moulded plastic; scale 1:35
- Magister Militum; kit UK78; injection-moulded plastic; scale 1:285
- Thunder Models; kits 35200 and 35207 (tractor and 30-ton semi-trailer), 35204 (tractor only), 35205 and 35208 (30-ton semi-trailer); injection-moulded plastic; scale 1:35

Although some of these might not still be in production, with a bit of searching on the internet they can probably all be located second-hand or as new old stock.

THE FINAL WORD

Scammell at war... a moment for reflection


I am the Tank Transporter..
When tanks go into battle, I'm not so far away. For only I can pick up steel-clad monsters damaged in the fray and take them to repair shops in the rear. The Motor Industry that makes me, can play a vital part in solving problems of unemployment when Peace returns.
THE MOTOR INDUSTRY
Production for Victory

I am the tank transporter... when tanks go into battle, I'm not so far away. For only I can pick-up steel-clad monsters damaged in the fray and take them to repair shops in the rear. The Motor Industry that makes me, can play a vital part in solving problems of unemployment when Peace returns.'

These words were written by Scammell themselves in May 1944, and published in a modest eight-page publication entitled 'The Scammell Front', 'as a record of how Scammell products are helping to win the war'.

And on 16 May 1945, a week or so after VE Day, the Scammell board of directors wrote the following in a four-page document entitled 'A moment for reflection, 1939-1945'... 'Scammells may be regarded as a typical cross-section of the British people... Scammell vehicles have become famous throughout the Services for their reliability and efficiency... and the quantities supplied have been far greater than was at first considered possible'.

A proud boast indeed... but, sadly, it was to be almost another 40 years before Scammell could once again claim to be the supplier of tank transporters to the British Army. In 1983, deliveries of the mighty Commander began.

● 30-ton Pioneer loaded with a US-built M3 medium tank, the height of which, when loaded on the semi-trailer, could cause something of a problem with low railway bridges.

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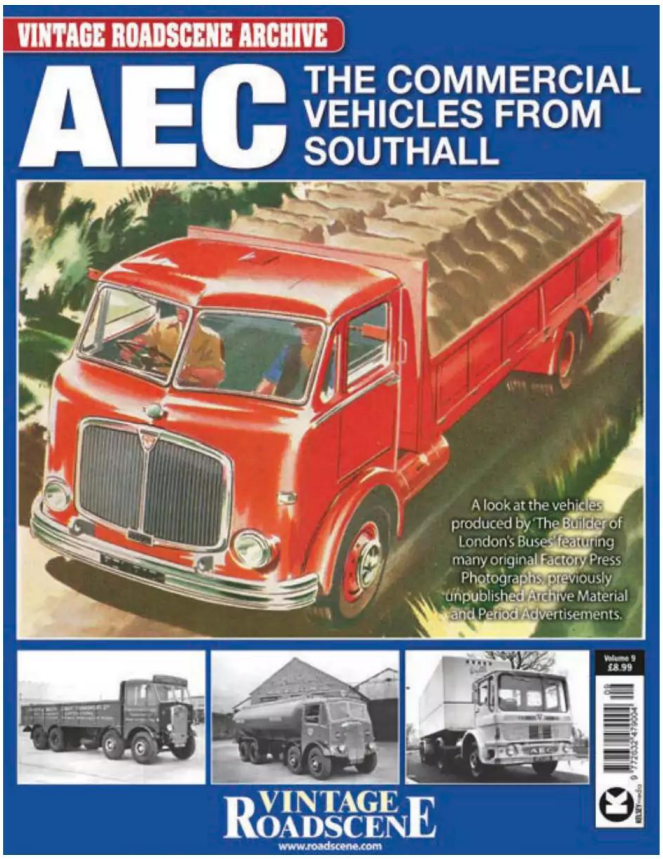
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The Diamond T tank transporter owes its existence to several, largely unrelated factors.

Firstly, during the mid-thirties the War Office failed to recognise that tank transporters might just be useful in the event of another war. It wasn't until 1937 that a contract was placed with Scammell for a handful of 20-ton transporters. But, perhaps, more telling, tanks were getting bigger and heavier, and even uprating the old Pioneer from 20 to 30 tons was not enough!

Clearly, the British Army needed a new tank transporter and, just as clearly, it was not going to be a Scammell.

Enter the Diamond T, a 40-ton American-built prime mover with an outrageous art-deco styled cab, and a long coffin nose housing a massive Hercules diesel engine. Handsome, capable and reliable, the Diamond T eventually clocked-up more than 30 years' military service, with many trucks eventually finding work on civvy street... going on to work on fairgrounds and in heavy haulage... before being snapped up by military-vehicle enthusiasts.

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